cat L65

UNITED CHEMI-CON

Aluminum Electrolytic Capacitors

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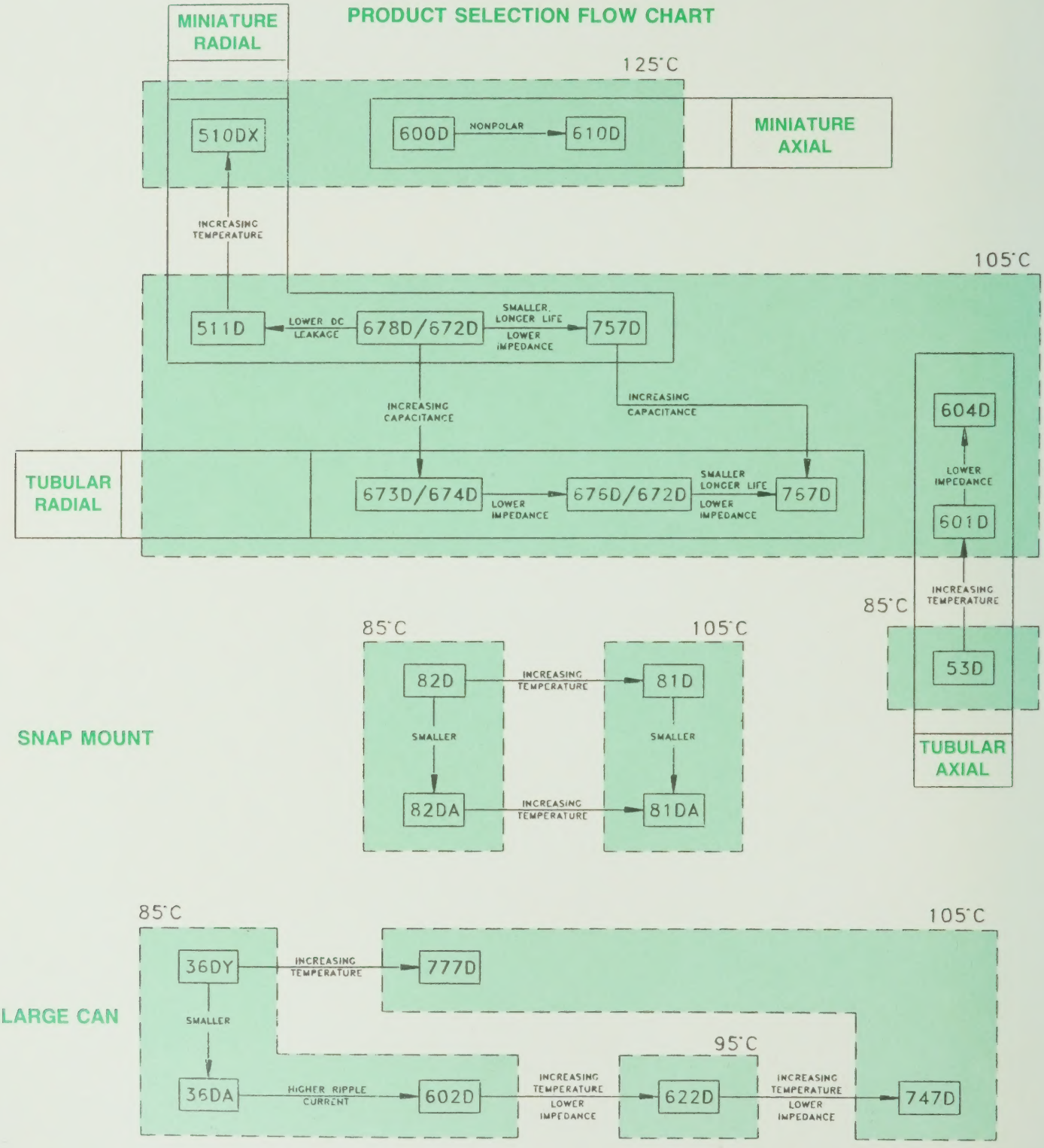
FUTURE IS UNIQUE

UNITED CHEMI-CON

Manufactured in USA

PRODUCT SELECTION FLOW CHART



In the construction of the components described, the full intent of the specification will be met. United Chemi-Con, however, reserves the right to make, from time to time, such departures from the detail specifications as may be required to permit improvements in the design of its products. Components made under military approvals will be in accordance with the approval requirements.

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Type/ Series	Description	Load Life °C	Load Life Hours	Equivalent Military Approval	New/Extended	High CV	–55°C Operation	Voltage Range (VDC)	Capacitance Range (µF)	Page
MINIATURE RADIAL	OUTLINE DRAWINGS									7
510DX	PREMIUM GRADE, HIGH TEMPERATURE	125	2000					.3 - 63	1.0 - 6,800	9
511D	GENERAL PURPOSE, LOW LEAKAGE	105	1000 2000			*		6.3 - 250	1.0 - 10,000	17
678D	LOW IMPEDANCE	105	4000			*	*	6.3 - 63	39 - 10,000	25
672D	HIGH RELIABILITY, HIGH RIPPLE CURRENT			M39018/08			*	100 - 250	4.7 - 390	25
757D	LONG LIFE, LOWEST IMPEDANCE	105	5000		*	*	*	6.3 - 35	120 - 15,000	34
MINIATURE AXIAL	OUTLINE DRAWINGS									41
600D	PREMIUM GRADE, HIGH TEMPERATURE	125	2000	M39018/01			*	5.0 - 250	2.2 - 2,700	42
610D	PREMIUM GRADE, NONPOLAR	125	2000	M39018/02			*	7.0 - 250	0.68 - 680	50
TUBULAR RADIAL	OUTLINE DRAWINGS									56
673D/674D	LOW ESR	105	2000	M39018/09			*	6.3 - 250	27 - 27,000	57
676D/677D	LOW IMPEDANCE, HIGH RIPPLE CURRENT	105	2000		*		*	6.3 - 63	220 - 39,000	67
767D	LOWEST IMPEDANCE	105	5000		*	*	*	6.3 - 35	820 - 39,000	72
TUBULAR AXIAL	OUTLINE DRAWINGS									79
53D	GENERAL PURPOSE	85	1000			*		6.3 - 450	15 - 220,000	80
601D	HIGH RELIABILITY	105	2000	M39018/03			*	6.3 - 300	12 - 33,000	94
604D	4-TERMINAL, VERY LOW INDUCTANCE	105	2000	M39018/07			*	5.0 - 200	47 - 22,000	105
SNAP MOUNT	OUTLINE DRAWINGS									100
81DA	HIGH TEMPERATURE	105	2000		*	*		6.3 - 400	56 - 270,000	113
81D	HIGH RIPPLE CURRENT	105	2000					6.3 - 400	47 - 180,000	126
82DA	HIGH CV	85	2000		*	*		6.3 - 500	33 - 270,000	135
82D	GENERAL PURPOSE	85	2000					6.3 - 450	39 - 180,000	150
RECTANGULAR PACKAGE	OUTLINE DRAWINGS									161
88D	LOW INDUCTANCE	85	2000					3.0 - 450	56 - 47,000	160
LARGE CANS	OUTLINE DRAWINGS									167
36DA	HIGH CV, EXTENDED VOLTAGE	85	2000		*			6.3 - 500	100 - 2,200,000	171
36DY	HIGH RIPPLE CURRENT	85	2000					6.3 - 450	100 - 2,200,000	185
777D	HIGH TEMPERATURE	105	2000		*	*		6.3 - 450	100 - 470,000	194
602D	HIGH RELIABILITY, HIGH RIPPLE CURRENT	85	2000	M39018/04			*	5.0 - 250	180 - 1,000,000	204
622D	LOW IMPEDANCE	95 85	1000 2000				* *	5.0 - 60	2,300 - 180,000	215
747D	LOWEST IMPEDANCE, HIGH TEMPERATURE	105	2000		*	*	*	6.3 - 63	4,800 - 310,000	223

PERFORMANCE CHARACTERISTICS

1. Storage Temperature

These capacitors may be subjected, without permanent damage, to conditions in transit where the temperature may range from -10°C below the minimum operating temperature to +10°C above the maximum operating temperature.

2. D-C Working Voltage

The d-c working voltage is the maximum operating voltage for continuous duty at the maximum rated temperature.

3. Surge Voltage

The surge d-c voltage specified in the Standard Ratings Tables is the maximum voltage to which the capacitor should be subjected under any conditions, including transients and peak ripple at the highest line voltage.

Unless stated differently, Capacitors will withstand rated surge voltage applied in series with a current limiting resistor under the following conditions:

DUTY CYCLE: VOLTAGE ON-$^1/_2$ MINUTE
VOLTAGE OFF-5$^1/_2$ MINUTES
NO. OF CYCLES: 1000
TEST TEMPERATURE: +25°C
CURRENT LIMITING RESISTOR
VALUE: ≤2500µF, 1000 OHMS
≥2500µF, $R = \frac{2.5 \times 10^6}{C}$

where,

C = rated capacitance in microfarads
R = resistance in ohms

After completion of the test and stabilization of the capacitor at +25°C, the leakage current will not exceed the initial specified limit.

4. Capacitance and ESR Measurement

Measurements are made by the 4 terminal bridge method at 120Hz and +25°C unless otherwise specified. Test voltage is ≤ 1 Volt RMS. Capacitance will be within the specified tolerance. ESR will be within the specified tolerance or be less than the maximum specified limit.

5. Leakage Current (DCL) Measurement

Measurements are performed at +25°C, ±5°C by applying rated voltage to the capacitor in series with a current-limiting resistor for the specified period of time. Capacitors are preconditioned by applying rated voltage for 15 minutes, 24 to 48 hours before testing.

The maximum leakage current will not exceed the value calculated from the specified equation, or limits listed in the part number rating charts.

6. Life Test.

Rated d-c voltage shall be applied to the capacitors for the specified time at the maximum operating temperature.

After being removed from the test chamber and stabilized at room temperature, capacitors will meet the specified electrical limits.

7. Vibration Test.

Capacitors are designed to withstand sinusoidal vibration conditions for 6 hours in any of 3 planes as shown below by product type:

FREQUENCY RANGE: 10-55Hz
MAXIMUM ACCELERATION: 10g
PRODUCT TYPES: 510DX, 511D, 762D, 678D, 53D, 81D, 81DA, 82D, 82DA, 604D, 36DY, 36DA, 602D, 622D, 747D, 757D, 777D

FREQUENCY RANGE: 10-1000Hz
MAXIMUM ACCELERATION: 15g
PRODUCT TYPES: 601D, 673D 674D, 676D, 677D, 767D, 88D

FREQUENCY RANGE: 10-2000Hz
MAXIMUM ACCELERATION: 15g
PRODUCT TYPES: 600D, 610D

Capacitors shall be securely mounted for the test by the body of the unit using an approved wrap-around clamp.

During the last hour of the test, capacitance and ESR measurements will be stable with no evidence of intermittent contacts. Upon completion of test, capacitors will not exhibit loosening of the internal section or other mechanical damage.

More rugged vibration capabilities are available on some products upon request.

8. Container Seal Test

Capacitors are capable of withstanding a seal tightness test as follows:

Two successive circulating air temperature cycles:

CYCLE: 15 minutes at maximum operating temperature, and return to +25°C; followed by 15 minutes at minimum operating temperature, and return to +25°C.

No chain or repetitive bubbling will occur after immersing the capacitors in water maintained at +90°C to +95°C for 5 minutes.

9. Shelf Test

Capacitors will meet specified Capacitance, ESR, and DC Leakage limits after being subjected to maximum operating temperature for the specified time with no voltage applied. Measurements will be taken after capacitors have stabilized at +25°C.

10. Insulation Test

Unless stated differently, capacitors are prepared for test by placing two wire windings (2 turns each) of 18 AWG (1mm) bare copper wire, spaced 0.250" (6.3mm) apart, around the insulating sleeve:

The insulating sleeve will withstand a dielectric strength test of 2000 Volts DC applied between the windings for one minute, without breakdown.

Insulation resistance, measured with a DC potential of 100 volts, applied between the windings for 2 minutes will be ≥ 100 megohms.

11. Vent Test

Capacitors with diameters exceeding 8mm (0.315") incorporate a vent designed to minimize the possibility of an accidental explosion should a capacitor be reverse polarized, or be subjected to over-voltage or misapplication. Vents may be located in the cover or case depending on the product type.

Caution: Vent test units in an explosion-proof chamber.

Capacitors with screw-insert terminals shall be mounted by an approved wrap-around clamp. Capacitors with wire-leads shall be mounted by normal mounting means, secured by the leads. A reverse DC voltage shall be applied. The voltage shall be of sufficient magnitude to produce a current in accordance with the following table.

CV Product	Current (Amp.)
0-500K	10
501K to 1000K	20
1001K and up	30

where

C = capacitance in microfarads
V = rated DC voltage

The vent shall operate without explosion or expulsion of the cover from the container. The container shall not rupture at any place other than the vent.

Occurrence of a short or open circuit within the capacitor shall not constitute a failure unless there is also explosive disruption of the capacitor.

12. Marking

The marking information on the capacitor is as follows, space permitting:

Nippon Chemi-Con trademark.
Product Type.
Nominal Capacitance (μF).
Rated Voltage (VDC).
EIA Standard Date Code.
Made in USA.
Maximum Operating Temperature.

13. Terminal/Lead Strength

Screw Terminals can withstand torque pressure for a period of up to 15 seconds as follows:

Screw Thread Terminal	No. of Threads Engaged	Torque (Pounds-Inches)		Torque (MM)	
		Min	Max	Min	Max
No. 10-32	3	12.0	18.0	1.4	2.0
No. 10-32	6	20.0	25.0	2.3	2.8
No. 1/4—28NF-2B	3	30.0	35.0	3.4	4.0
No. 1/4—28NF-2B	6	45.0	55.0	5.1	6.2
M4	3	4.0	7.0	0.5	0.8
M4	6	10.0	14.0	1.1	1.6
M5	3	12.0	18.0	1.4	2.0
M5	6	20.0	25.0	2.3	2.8
M8 STUD	—	—	35.0	—	4.0
M12 STUD	—	—	88.0	—	10.0

Unless stated differently, lead wire capacitors can withstand a steady pull applied axially to the leads without breakage as follows:

Wire Size		Tensile Force	
AWG	Dia. mm	Lbs	Kg
25—24	0.45—0.5	1.1	0.5
22—20	0.6—0.8	2.2	1.0
18	1.0	5	2.0

Holding Time: 10 seconds

Wire leads will withstand bending at the point of egress from the capacitor, first 90° in one direction, then back to the original position, and then 90° in the opposite direction, without breakage.

14. Solderability Test

Unless stated differently, circuit board mountable capacitor leads will retain ≥95% solder-wetting ability under the following conditions:

SOLDER TYPE: Conforms to type "S" composition Sn60 or Sn63 per Mil-Std-QQ-S-571.
FLUX TYPE: RMA
SOLDER TEMP: 245°C (+5°C,-0°C)
IMMERSION RATE:1inch (25mm)/second
SOLDER BATH HOLD TIME: 5 seconds
WITHDRAWAL RATE:1inch(25mm)/second

GUIDE TO APPLICATION

1. Rated Voltage

The rated (or working) voltage is the sum of the DC Voltage and AC Voltage which can be continuously applied to the capacitor. Derating the applied voltage will improve the failure rate of the capacitor.

2. Reverse Voltage

Corrrect polarity must be observed in the installation and operation of polarized electrolytic capacitors. The intermittent application of reverse voltage ≤1.5 volts will not cause a significant change in the normal performance characteristics.

3. Energy/Discharge Application

Frequent charge and discharge of voltages into a low resistance may damage capacitors. Upon request, United Chemi-Con can offer special designs in most product types for use in these applications.

4. Ripple Current

Applicable RMS values of the maximum allowable AC current limits, temperature and frequencies are listed in the Standard Ratings Tables.

Increased frequencies and/or reduced ambient temperatures will improve maximum ripple current capabilities. Frequency and temperature coefficients for typical applications are listed in the product type section.

Some maximum ripple current conditions could exceed the maximum continuous current capabilities of the terminals/leads of the capacitor. Maximum continuous current limitations are as follows:

Product Types	Terminal Code	Max Current
Large Can	A,B,I,M,N,T	30 Amps
	D (High Current Option)	50 Amps
	P,L	25 Amps
Snap Mount	All	25 Amps

5. Temperature Characteristics

Capacitance, ESR, and Leakage current change with respect to temperature. Specified limits are referenced at +25°C.

Capacitance and leakage current have positive temperature coefficients, while ESR exhibits negative temperature coefficients.

The product type sections provide temperature curves or low temperature performance limits for these parameters.

6. Installation Considerations

PCB mountable capacitors with ≤20AWG (0.8mm) leads may be damaged by excessive solder temperatures and exposure times. Solder temperatures should not exceed +260°C and exposure times limited to 10 seconds or less.

Excessive force applied to leads or terminals of capacitors may cause damage. Refer to Item 13 in the Performance Characteristics section for more information.

Extra terminals are provided on some product types for mounting stability or polarity assurance. These terminals may not be completely isolated from the capacitor and must be electrically isolated on the circuit board, and never connected to the positive or negative terminal.

Larger capacitors or capacitors in series/parallel banks can exhibit high watt-second ratings. Improper design, testing or use could result in an explosion or shock hazard. Proper precautions in designing of capacitor banks must be taken to protect against large fault currents which may occur in the event of a short circuit.

When connecting capacitors in series, matching of capacitance values may be necessary to avoid imbalance. Proper voltage sharing equalization with shunt resistors (or equivalent) is recommended to compensate for leakage current variances.

7. Insulating and Grounding

Where a potential difference exists between the cathode terminal and the chassis or other metallic mounting surfaces (usually at ground potential), outer insulation should be specified in order to isolate the case from the mounting surfaces.

8. Expected Life

Expected life is the function of the rate of electrolyte loss by means of vapor transmission through the end seal. The rate of loss is a function of the operating or storage temperature, and is relatively insensitive to the operating voltage. Electrical parameters should be within the limits specified in the life test product type section information. (Technical Paper available on request.)

Life can be extended by derating according to environmental and electrical requirements.

9. Storage and Shelf Life

These capacitors can normally be stored 10 years or more at temperatures of ≤+40°C without significant increase in leakage current or other degradation. Higher storage temperatures will increase leakage current with time. This is

a temporary condition which can be corrected by reconditioning.

It is recommended that capacitors stored for more than 3 years be checked at room temperature for leakage current in accordance with Performance Characteristics, Section 5, before use.

10. Cleaning Solvents

Halogenated cleaning solvents may damage capacitors or shorten their operating life. United Chemi-Con offers resin end seal options on most PCB mountable capacitors to protect against common solvents and cleaning procedures. See the product type sections for availability.

11. High Altitude

Aluminum electrolytic capacitors are not significantly affected by reduced atmospheric pressure and can be used at any altitude. Contact United Chemi-Con for operation at conditions greater than atmospheric pressure.

12. Radiation

Aluminum electrolytic capacitors are not subject to the harmful effects of radiation.

13. Reliability

Reliability is a measure of the failure rate during the expected life period of the capacitor. Reliability can be increased by decreasing the operating voltage and/or temperature. Failure rates are expressed in %/1000 hours and are in accordance with MIL-STD-690 at a 60% confidence level.

14. EQUIVALENT SERIES INDUCTANCE

Type	Diameter Code	Typical Inductance (nH)
Large Can	A	12 nH
	E	16 nH
	B	21 nH
	C	25 nH
	D	34 nH
Radial Tubulars	G	10 nH
	H	11 nH
	J	13 nH
Snap Mount	H	6 nH
	J	8 nH
	K	10 nH
	M	12 nH
	N	15 nH
Radial Miniatures	C	4 nH
	D	7 nH
	E	10 nH
	F	12 nH

Special Designs

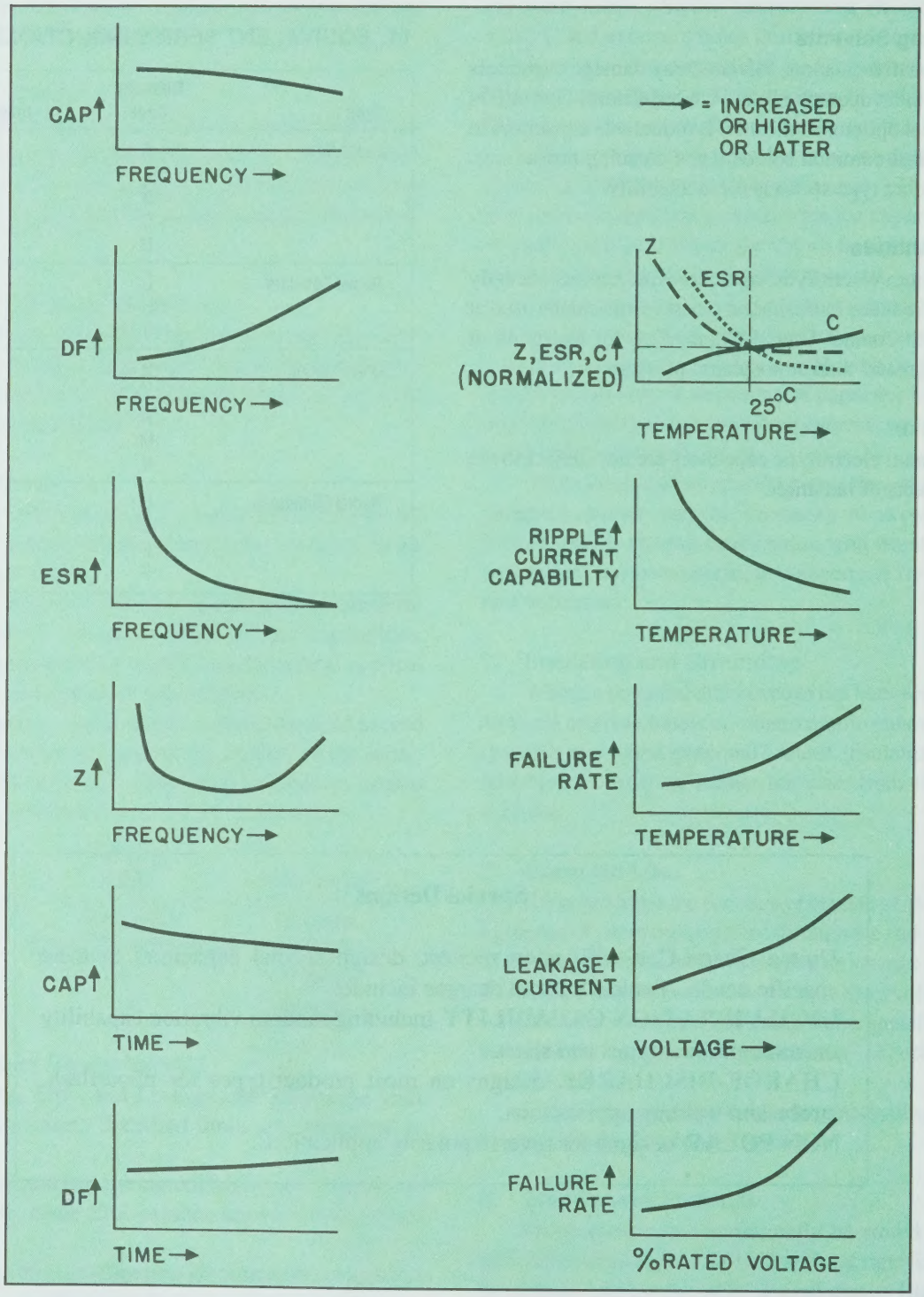
United Chemi-Con will, upon request, design special capacitors to meet specific needs. Typical custom designs include:

HIGH VIBRATION CAPABILITY including random vibration capability on some product types and sizes.

CHARGE-DISCHARGE designs on most product types for photoflash, strobe and welding applications.

NON POLAR designs for reverse polarity applications.

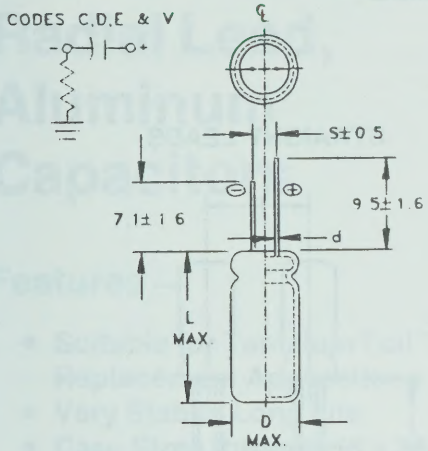
ALUMINUM ELECTROLYTIC CHARACTERISTICS VARY WITH TEMPERATURE, FREQUENCY, TIME AND APPLIED VOLTAGE.



Dwg. No. A-14,897

OUTLINE DRAWINGS
FOR MINIATURE RADIAL LEAD CAPACITORS
DIMENSIONS IN MILLIMETERS

TERMINAL CODE C



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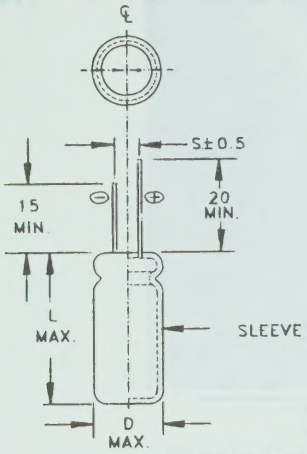

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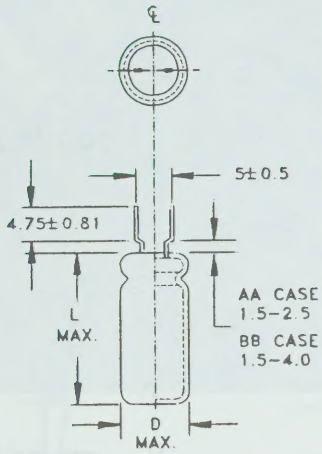
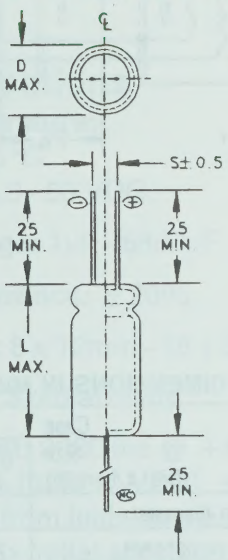
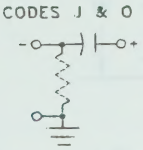


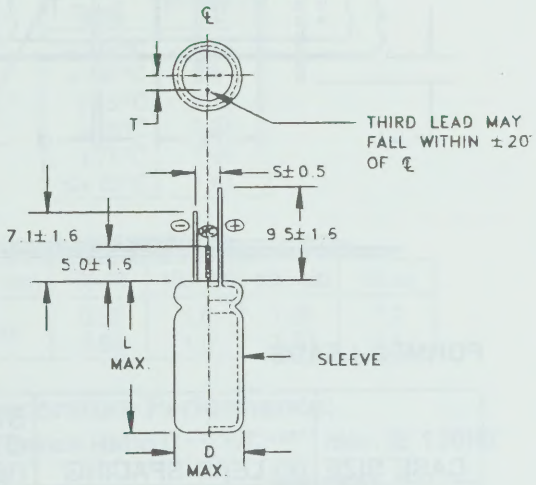
TERMINAL CODE J



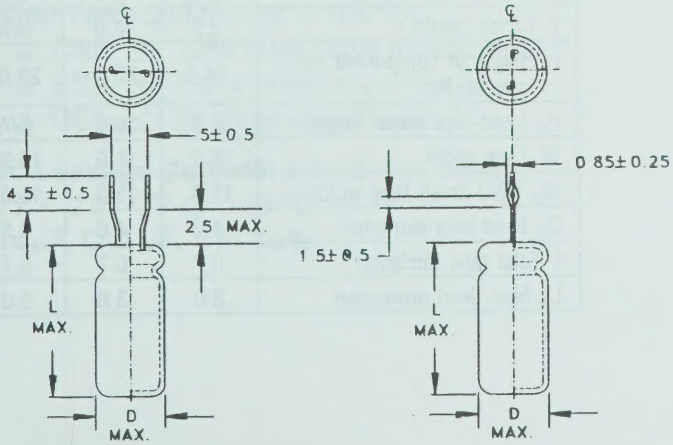


TERMINAL CODES J AND O AVAILABLE FOR 12.5, 16, AND 18mm DIA. UNITS

TERMINAL CODE O



TERMINAL CODE V 6—8mm DIA.



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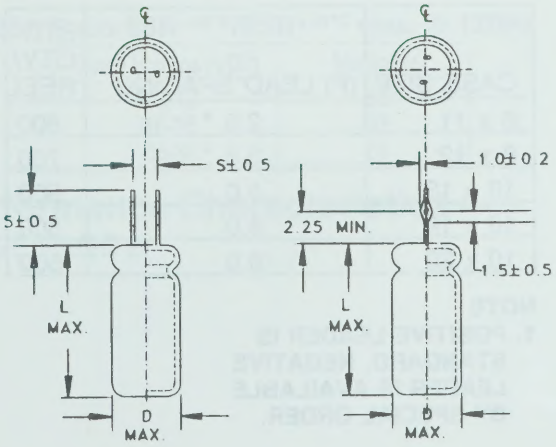
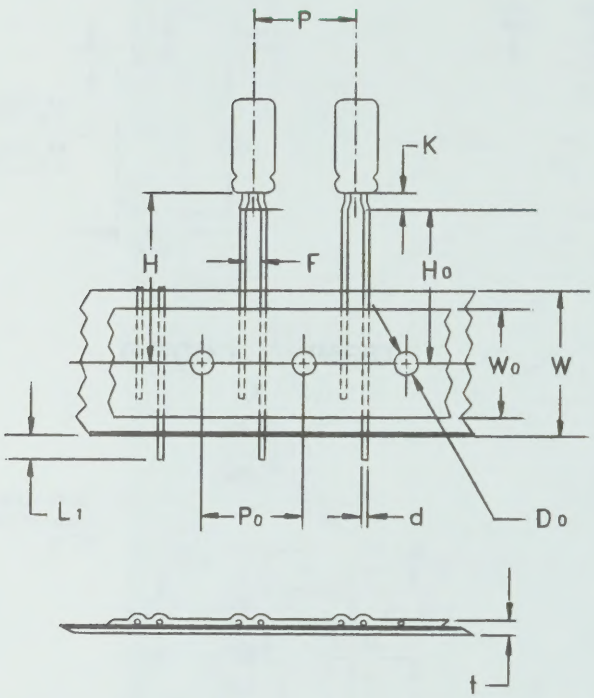


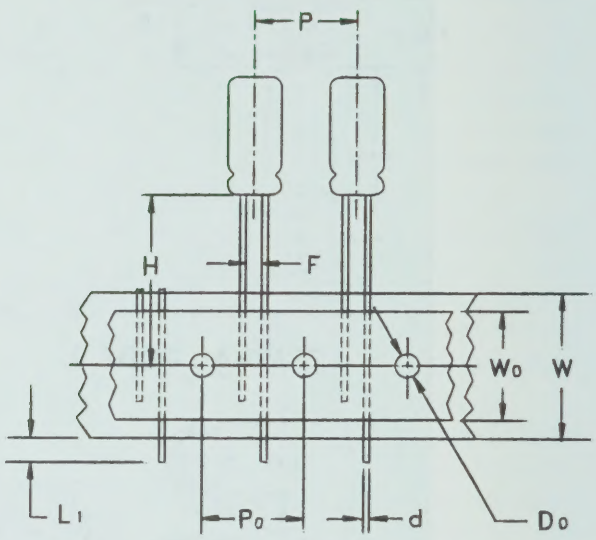
TAPE AND REEL PACKING SPECIFICATIONS TO EIA STANDARD RS—468 FOR TYPES 510DX, 511D, 672D, 678D, & 757D

TERMINAL CODE "I" TAPE & REEL
TERMINAL CODE "+" TAPE & AMMO

FORMED LEADS



STRAIGHT LEADS



FORMED LEADS

CASE SIZE	(F) LEAD SPACING	STD. QTY/ REEL
6 x 11	5.0	800
8 x 12	5.0	700

UNFORMED (STRAIGHT) LEADS

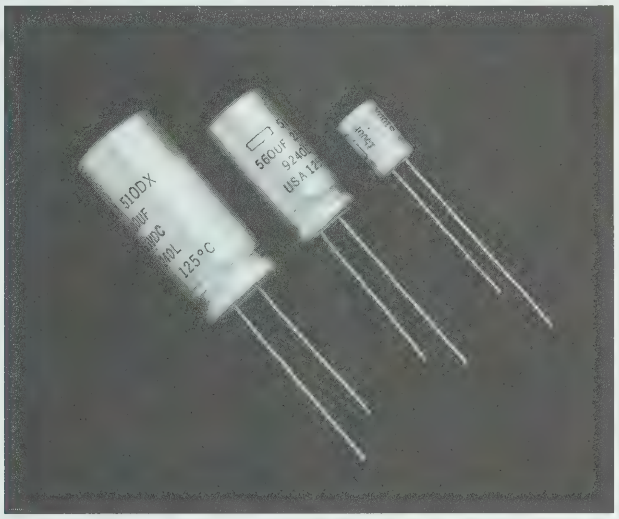
CASE SIZE	(F) LEAD SPACING	STD. QTY/ REEL
6 x 11	2.5 *	800
8 x 12	3.5 *	700
10 x 13	5.0	500
10 x 16	5.0	500
10 x 20	5.0	500

NOTE
1. POSITIVE LEADER IS STANDARD. NEGATIVE LEADER IS AVAILABLE BY SPECIAL ORDER.

DIMENSIONS IN MILLIMETERS

Item (Dia. x Length) / Case Size	6 x 11	8 x 12	10 x 13 10 x 16 10 x 20
d Lead-wire diameter	0.63	0.63	0.63
P Pitch of component	12.7	12.7	12.7
P_0 Feed hole pitch	12.7	12.7	12.7
F Lead-to-lead distance	5.0	5.0	5.0
K Clinch height	2.5	4.0	N/A
H Height of component from tape center	18.5	20.0	23.0
H_0 Lead-wire clinch height	16.0	16.0	N/A
W Tape width	18.0	18.0	18.0
W_0 Hold down tape width	15.0	15.0	15.0
D_0 Feed hole diameter	4.0	4.0	4.0
f Total tape thickness	0.7	0.7	0.7
L_1 Max. lead protrusion	3.0	3.0	3.0

+125°C Miniature, Radial Lead, Aluminum Capacitors



L65-01

Features —

- **Suitable for Tantalum Foil Replacement Applications**
- **Very Stable, Long Life**
- **Case Sizes through 18 x 36mm**
- **Optional 3rd Lead on Diameters ≥ 12.5mm**

General Specifications —

Operating Temperature: −40°C to +125°C.

Voltage Range: 6.3 - 63 VDC.

Capacitance Range: 1μF - 6800μF.

Capacitance Tolerance: ±20%.

Case Size Range: 8 x 12mm - 18 x 36mm.

Termination: 2 or 3 radial leads.

Life Validation Test: 2000 hrs @ +125°C:
- Δ CAP ≤ 15% (6.3 - 10 VDC), ≤ 10% (16 - 63 VDC) from initial measurement.
- Δ ESR ≤ 1.25x initial specified limit.
- Δ DCL ≤ initial specified limit.

Shelf Test: 500 hrs. @ +105°C:
- Δ CAP ≤ 12% from initial measurement.
- Δ ESR ≤ 1.25x initial specified limit.
- Δ DCL ≤ 2x initial specified limit.

DC Leakage Current: after 2 min. charge.
I = 0.01 CV @ +25°C
I in μA, C in μF, V in Volts

Ripple Current Multipliers:

TEMPERATURE

Ambient Temp.	Multipliers
+125°C	0.45
+105°C	1.0
+95°C	1.18
+85°C	1.34
+75°C	1.48
≤+65°C	1.61

FREQUENCY Hz.

Frequency (Hz)	50-60	100-120	300-400	1K-up
Multipliers	0.85 0.80	1.0 1.0	1.05 1.30	1.1 1.4

Low Temperature Performance:

Capacitance Ratio $C^{-55°C}/C^{+25°C}$ min. @ 120Hz

Rated Voltage (VDC)	Capacitance Remaining
6.3-10	75%
16-25	80%
35-63	85%

ESR Ratio $ESR^{-55°C}/ESR^{+25°C}$ max. @ 120Hz

Rated Voltage (VDC)	Multiplier
6.3-10	35
16-25	30
35-63	25

Performance Characteristics —

SEE PAGE 2.

Catalog Numbering System

510DX 187 M 6R3 BB 2 D

LEAD CODE. D = STRAIGHT LEADS (Standard).
E = LEAD FORM TO 5mm CENTERS.
J = 3 LEAD AXIAL MOUNT.*
O = KEYED POLARITY 3 LEAD RADIAL MOUNT.†
C = CUT LEADS.
V = SNAP IN FORMED LEADS.
I = TAPE AND REEL PACKAGING.
+ = TAPE AND AMMO PACK.

CASE STYLE. 2 = POLYESTER INSULATING SLEEVE (Standard).
3 = PVC SLEEVE WITH RESIN END SEAL.**
(Required for exposure to halogenated cleaning solvents).
4 = PVC SLEEVE.**
5 = POLYESTER SLEEVE WITH RESIN END SEAL.
(Required for exposure to halogenated cleaning solvents).

CASE CODE. SEE DIMENSIONS.

DC VOLTAGE RATING. IN VOLTS. AN 'R' IS USED TO SIGNIFY A DECIMAL POINT. FOR EXAMPLE, 6R3 = 6.3 VOLTS.

CAPACITANCE TOLERANCE. M = ±20%.

CAPACITANCE. EXPRESSED IN PICOFARADS. THE FIRST TWO DIGITS ARE SIGNIFICANT FIGURES, THE THIRD IS THE NUMBER OF ZEROS.

TYPE NUMBER. IDENTIFIES THE BASIC CAPACITOR DESIGN.

*Available for 12.5, 16 and 18mm dia. units.
**Sleeving rated to +105°C.
†Available for 12.5, 16 and 18mm dia. units with resin end seal.

DIMENSIONS IN MILLIMETERS

CASE CODE	NOMINAL DIAMETER	NOMINAL LENGTH	STYLES 2 and 4 D Max.	STYLES 2 and 4 L Max.	STYLES 3 and 5 D Max.	STYLES 3 and 5 L Max.	LEAD SPACING S, ±.6	LEAD SPACING T, ±.5	LEAD DIAMETER (d) NOM.	LEAD DIAMETER (d) AWG NO.	TYPICAL WEIGHT GRAMS
BB	8	12	8.5	13.0	8.5	14.0	3.5	N/A	0.63	22	1.0
BD	8	16	8.5	17.0	8.5	18.8	3.5	N/A	0.63	22	1.4
CC	10	13	10.5	14.3	10.5	16.0	5.0	N/A	0.63	22	1.7
CD	10	16	10.5	17.0	10.5	18.8	5.0	N/A	0.63	22	2.0
CG	10	20	10.5	21.5	10.5	23.0	5.0	N/A	0.63	22	2.5
DG	12.5	20	13.0	21.5	13.0	23.0	5.0	2.5	0.81	20	3.8
DK	12.5	25	13.0	26.5	13.0	29.0	5.0	2.5	0.81	20	4.5
DM	12.5	26.5	13.0	28.0	13.0	29.5	5.0	2.5	0.81	20	4.7
DT	12.5	33.5	13.0	34.2	13.0	36.0	5.0	2.5	0.81	20	5.8
DS	12.5	42.5	13.0	43.7	13.0	45.5	5.0	2.5	0.81	20	7.3
EK	16	25	16.5	26.2	16.5	27.9	7.5	3.8	0.81	20	7.2
EN	16	32	16.5	33.5	16.5	36.0	7.5	3.8	0.81	20	9.4
ER	16	36	16.5	37.5	16.5	40.0	7.5	3.8	0.81	20	10.6
EU	16	40	16.5	41.7	16.5	42.4	7.5	3.8	0.81	20	11.8
FR	18	36	18.5	37.5	18.5	40.0	7.5	3.8	0.81	20	13.4

STANDARD RATINGS

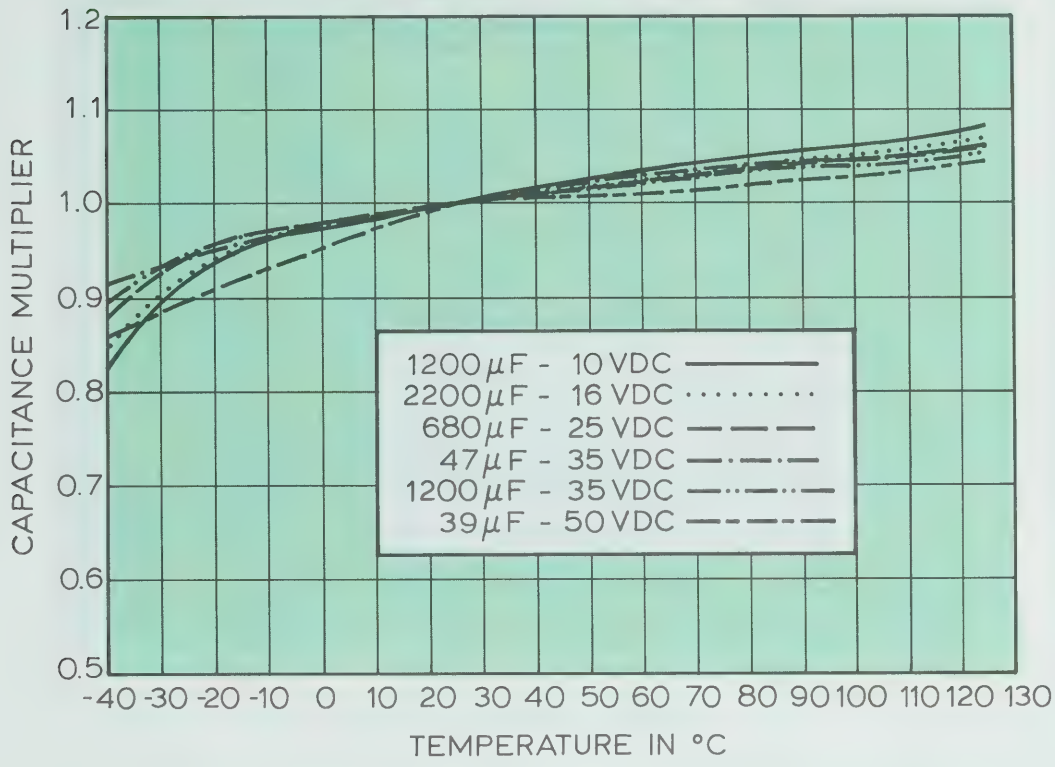
μF	Catalog Number	Nominal Case Size (mm) D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20-40kHz	Max. Ripple Current @ +105°C (A) 120Hz	Max. Ripple Current @ +105°C (A) 20k-40kHz	Max. Z @ +25°C (mΩ) 100kHz
6.3 VOLTS DC WORKING; 8 VOLTS DC SURGE							
180	510DX187M6R3BB2D	8 x 12	2210	912	0.182	0.283	821
330	510DX337M6R3BD2D	8 x 16	1206	507	0.276	0.425	457
330	510DX337M6R3CC2D	10 x 13	1206	507	0.294	0.454	457
560	510DX567M6R3CD2D	10 x 16	710	317	0.412	0.616	286
820	510DX827M6R3CG2D	10 x 20	485	212	0.553	0.837	191
1000	510DX108M6R3DG2D	12.5 x 20	398	201	0.697	0.984	181
1500	510DX158M6R3DK2D	12.5 x 25	265	133	0.931	1.313	121
1800	510DX188M6R3DM2D	12.5 x 26.5	221	120	1.039	1.412	108
2200	510DX228M6R3DT2D	12.5 x 33.5	181	89	1.243	1.769	80
2700	510DX278M6R3EK2D	16 x 25	147	71	1.438	2.068	64
3900	510DX398M6R3EN2D	16 x 32	102	49	1.905	2.749	44
4700	510DX478M6R3ER2D	16 x 36	85	40	2.193	3.193	36
6800	510DX688M6R3FR2D	18 x 36	59	36	2.844	3.641	32
10 VOLTS DC WORKING; 13 VOLTS DC SURGE							
150	510DX157M010BB2D	8 x 12	2210	948	0.182	0.278	854
220	510DX227M010BD2D	8 x 16	1507	528	0.247	0.417	475
270	510DX277M010CC2D	10 x 13	1228	528	0.292	0.445	475
390	510DX397M010CD2D	10 x 16	850	330	0.377	0.604	297
560	510DX567M010CG2D	10 x 20	592	220	0.501	0.821	198
680	510DX687M010DG2D	12.5 x 20	488	207	0.629	0.965	187
1200	510DX128M010DK2D	12.5 x 25	276	138	0.911	1.287	124
1800	510DX188M010DT2D	12.5 x 33.5	184	93	1.232	1.734	84
1800	510DX188M010EK2D	16 x 25	184	74	1.285	2.027	67
2700	510DX278M010EN2D	16 x 32	123	51	1.737	2.695	46
3300	510DX338M010ER2D	16 x 36	100	42	2.018	3.114	37
4700	510DX478M010FR2D	18 x 36	71	37	2.582	3.576	33
16 VOLTS DC WORKING; 20 VOLTS DC SURGE							
82	510DX826M016BB2D	8 x 12	2588	986	0.168	0.272	888
150	510DX157M016BD2D	8 x 16	1415	549	0.255	0.409	494
150	510DX157M016CC2D	10 x 13	1415	549	0.272	0.436	494
270	510DX277M016CD2D	10 x 16	786	343	0.392	0.593	309
390	510DX397M016CG2D	10 x 20	544	229	0.522	0.805	206
470	510DX477M016DG2D	12.5 x 20	451	216	0.654	0.946	194
820	510DX827M016DK2D	12.5 x 25	259	144	0.941	1.262	129
1200	510DX128M016DT2D	12.5 x 33.5	177	97	1.257	1.701	87
1200	510DX128M016EK2D	16 x 25	177	77	1.311	1.987	70
1800	510DX188M016EN2D	16 x 32	118	53	1.772	2.643	48
2200	510DX228M016ER2D	16 x 36	96	43	2.060	3.078	39
3300	510DX338M016FR2D	18 x 36	64	39	2.719	3.501	35
25 VOLTS DC WORKING; 32 VOLTS DC SURGE							
56	510DX566M025BB2D	8 x 12	2605	1026	0.168	0.267	923
100	510DX107M025BD2D	8 x 16	1459	571	0.251	0.401	514
100	510DX107M025CC2D	10 x 13	1459	571	0.268	0.428	514
180	510DX187M025CD2D	10 x 16	810	357	0.386	0.581	321
270	510DX277M025CG2D	10 x 20	540	238	0.524	0.789	214
330	510DX337M025DG2D	12.5 x 20	442	224	0.661	0.927	202
470	510DX477M025DK2D	12.5 x 25	310	150	0.859	1.238	135
560	510DX567M025DM2D	12.5 x 26.5	261	135	0.957	1.331	121
680	510DX687M025DT2D	12.5 x 33.5	215	100	1.141	1.667	90
820	510DX827M025EK2D	16 x 25	178	80	1.307	1.949	72
1200	510DX128M025EN2D	16 x 32	122	55	1.742	2.595	50
1500	510DX158M025ER2D	16 x 36	97	45	2.049	3.009	40
1800	510DX188M025FR2D	18 x 36	81	40	2.417	3.439	36

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size (mm) D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20-40kHz	Max. Ripple Current @ +105°C (A) 120Hz	Max. Ripple Current @ +105°C (A) 20k-40kHz	Max. Z @ +25°C (mΩ) 100kHz
35 VOLTS DC WORKING; 44 VOLTS DC SURGE							
47	510DX476M035BB2D	8 x 12	2822	1067	0.161	0.262	960
82	510DX826M035BD2D	8 x 16	1617	593	0.238	0.393	534
100	510DX107M035CC2D	10 x 13	1326	593	0.281	0.421	534
150	510DX157M035CD2D	10 x 16	884	371	0.369	0.571	334
220	510DX227M035CG2D	10 x 20	603	248	0.496	0.774	223
270	510DX277M035DG2D	12.5 x 20	491	233	0.627	0.911	210
470	510DX477M035DK2D	12.5 x 25	282	156	0.901	1.214	140
680	510DX687M035DT2D	12.5 x 33.5	195	104	1.197	1.615	94
820	510DX827M035EK2D	16 x 25	162	84	1.371	1.902	75
1200	510DX128M035EN2D	16 x 32	111	58	1.826	2.527	52
1500	510DX158M035ER2D	16 x 36	88	47	2.151	2.944	42
1800	510DX188M035FR2D	18 x 36	74	42	2.534	3.366	38
50 VOLTS DC WORKING; 63 VOLTS DC SURGE							
39	510DX396M050BB2D	8 x 12	3061	1110	0.155	0.257	999
68	510DX686M050BD2D	8 x 16	1755	617	0.229	0.385	555
82	510DX826M050CC2D	10 x 13	1456	617	0.268	0.412	555
120	510DX127M050CD2D	10 x 16	995	386	0.348	0.559	347
180	510DX187M050CG2D	10 x 20	663	258	0.473	0.759	232
220	510DX227M050DG2D	12.5 x 20	543	243	0.597	0.892	218
330	510DX337M050DK2D	12.5 x 25	362	162	0.796	1.191	146
390	510DX397M050DM2D	12.5 x 26.5	306	146	0.883	1.281	131
560	510DX567M050DT2D	12.5 x 33.5	213	109	1.145	1.604	98
560	510DX567M050EK2D	16 x 25	213	87	1.194	1.87	78
820	510DX827M050EN2D	16 x 32	146	60	1.595	2.485	54
1000	510DX108M050ER2D	16 x 36	119	49	1.847	2.883	44
1500	510DX158M050FR2D	18 x 36	80	43	2.432	3.317	39
63 VOLTS DC WORKING; 79 VOLTS DC SURGE							
27	510DX276M063BB2D	8 x 12	3438	1154	0.146	0.252	1039
47	510DX476M063BD2D	8 x 16	1975	642	0.215	0.378	578
47	510DX476M063CC2D	10 x 13	1975	642	0.231	0.404	578
82	510DX826M063CD2D	10 x 16	1132	401	0.326	0.548	361
120	510DX127M063CG2D	10 x 20	774	268	0.438	0.744	241
150	510DX157M063DG2D	12.5 x 20	619	252	0.559	0.875	227
220	510DX227M063DK2D	12.5 x 25	422	168	0.737	1.167	151
270	510DX277M063DM2D	12.5 x 26.5	344	151	0.833	1.255	136
390	510DX397M063DT2D	12.5 x 33.5	238	113	1.083	1.572	102
390	510DX397M063EK2D	16 x 25	238	90	1.131	1.834	81
560	510DX567M063EN2D	16 x 32	166	62	1.494	2.444	56
680	510DX687M063ER2D	16 x 36	137	51	1.724	2.826	45
1000	510DX108M063FR2D	18 x 36	93	45	2.256	3.243	41

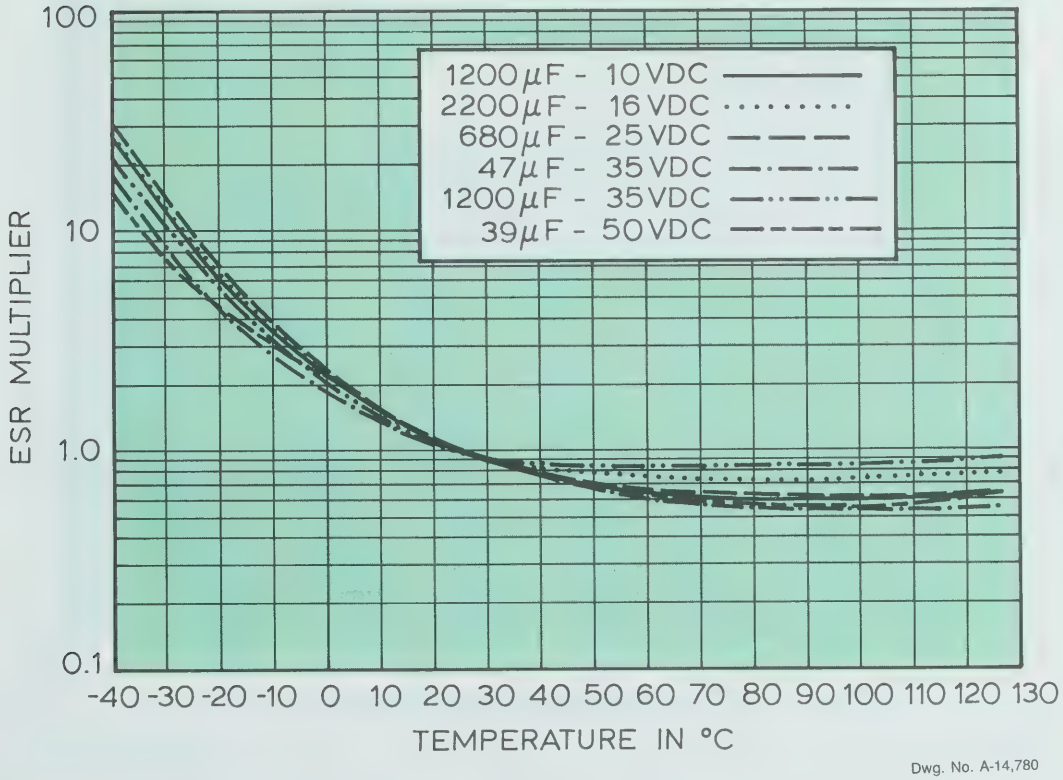
TYPICAL CURVES

TYPE 510DX — TYPICAL CAPACITANCE MULTIPLIER VS. TEMPERATURE @ 120 Hz



Dwg. No. A-14,781

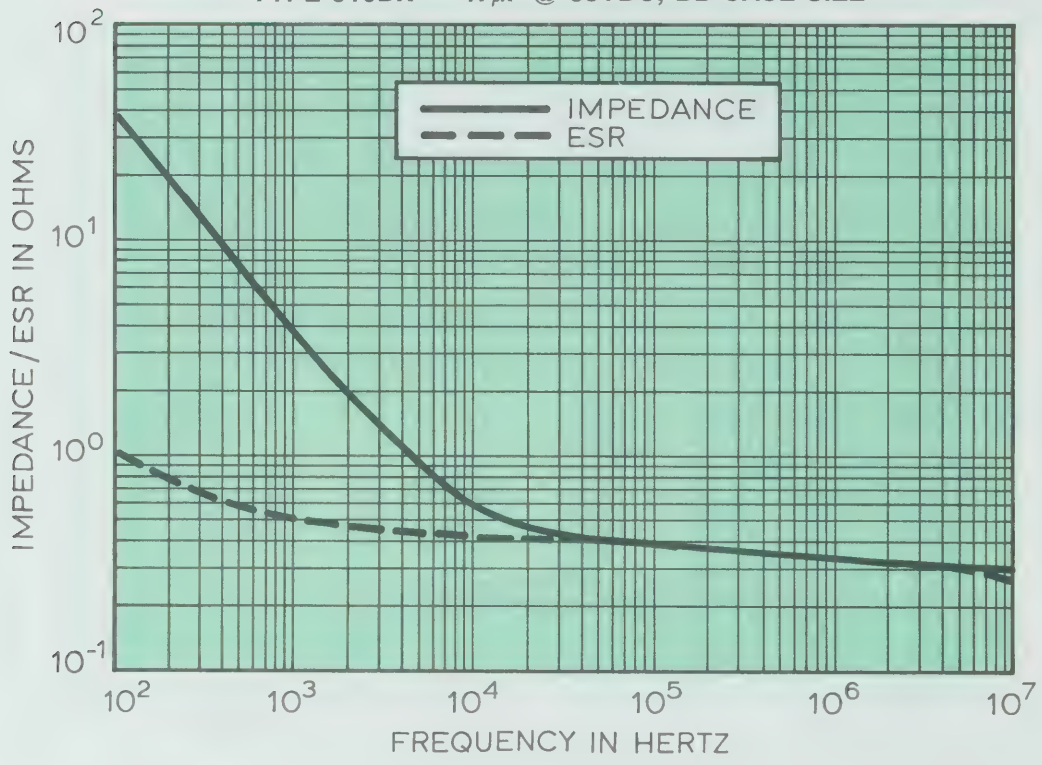
TYPE 510DX — TYPICAL ESR MULTIPLIER VS. TEMPERATURE @ 120 Hz



Dwg. No. A-14,780

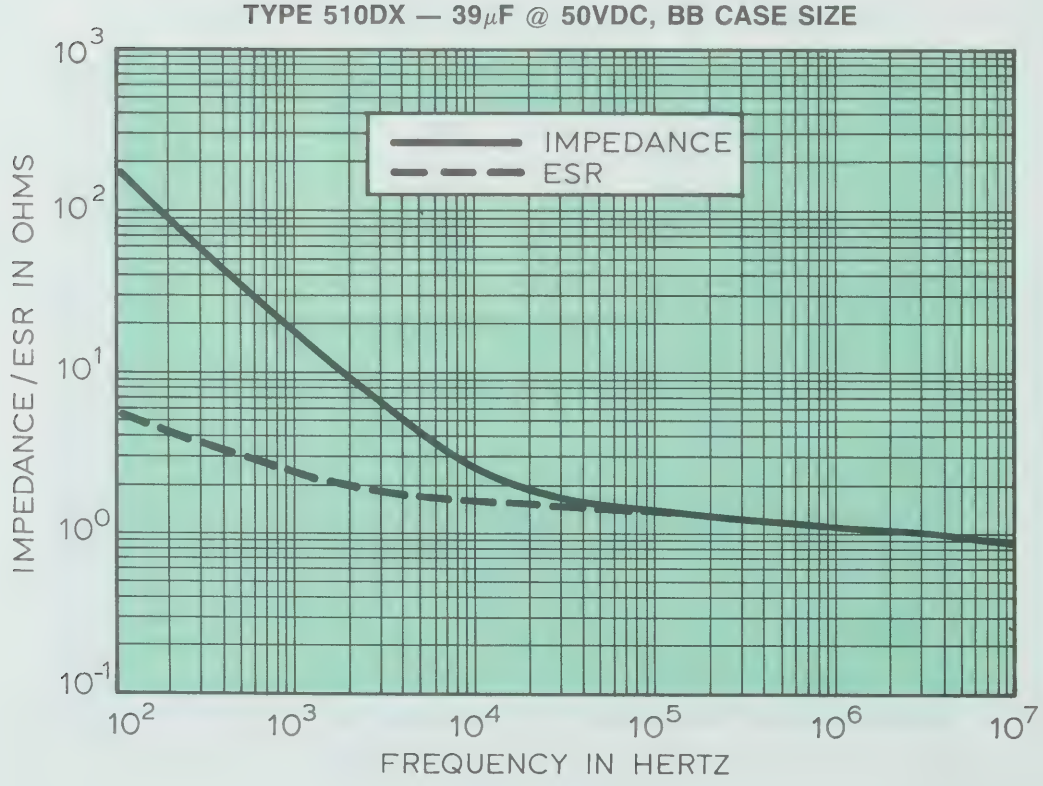
TYPICAL CURVES @ +25°C

TYPE 510DX — 47μF @ 35VDC, BB CASE SIZE



Dwg. No. A-14,744

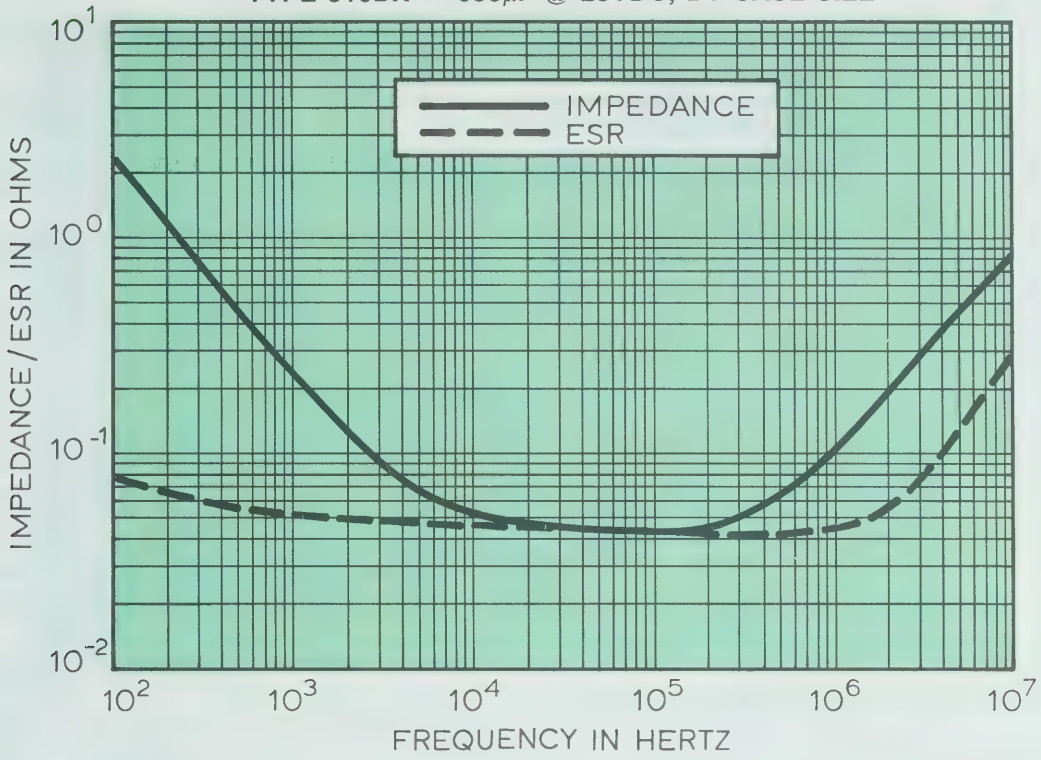
TYPE 510DX — 39μF @ 50VDC, BB CASE SIZE



Dwg. No. A-14,745

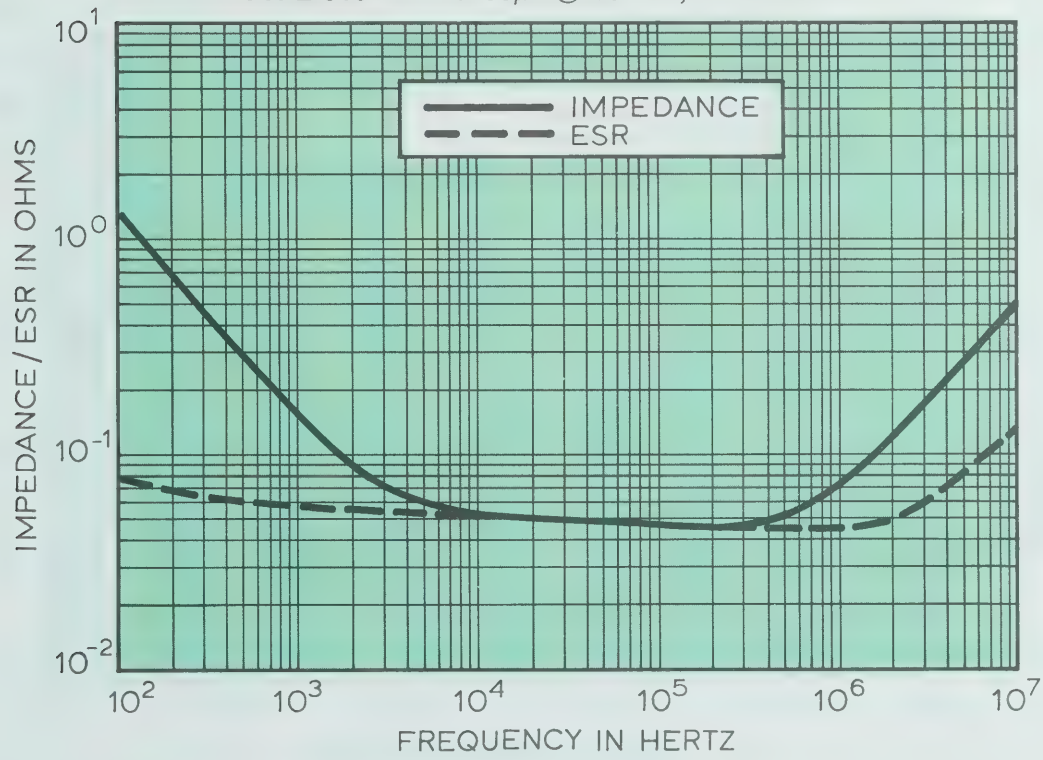
TYPICAL CURVES @ +25°C

TYPE 510DX — 680μF @ 25VDC, DT CASE SIZE



Dwg. No. A-14,742

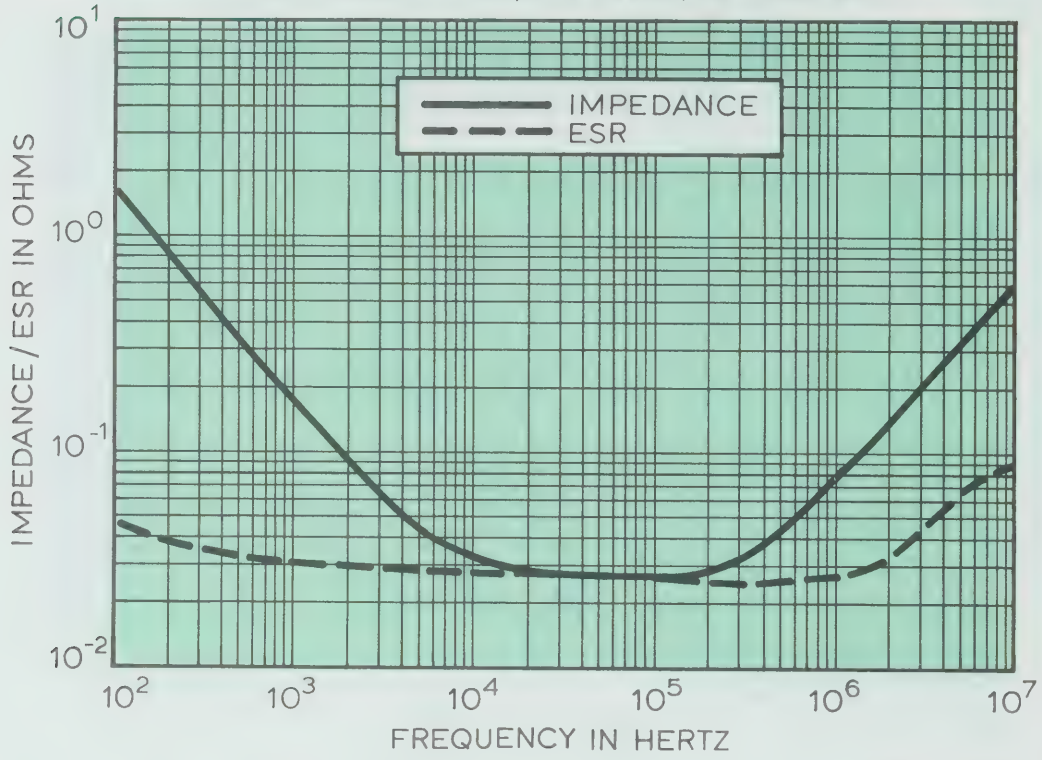
TYPE 510DX — 1200μF @ 10VDC, DK CASE SIZE



Dwg. No. A-14,740

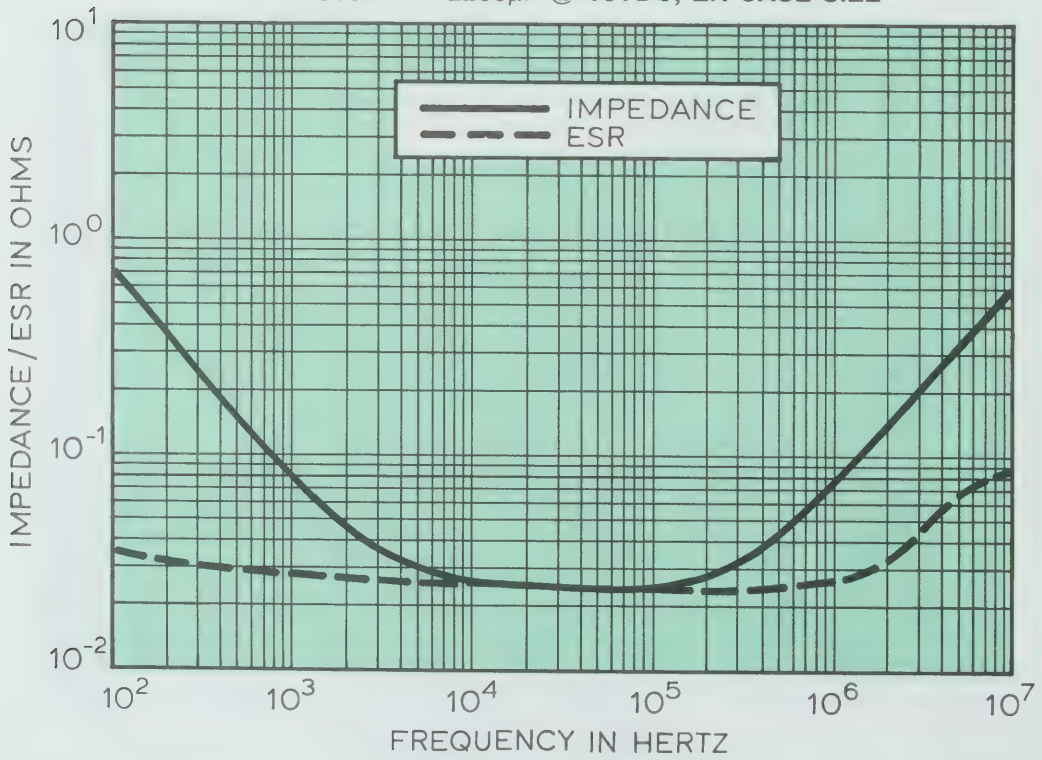
TYPICAL CURVES @ +25°C

TYPE 510DX — 1200μF @ 35VDC, EN CASE SIZE



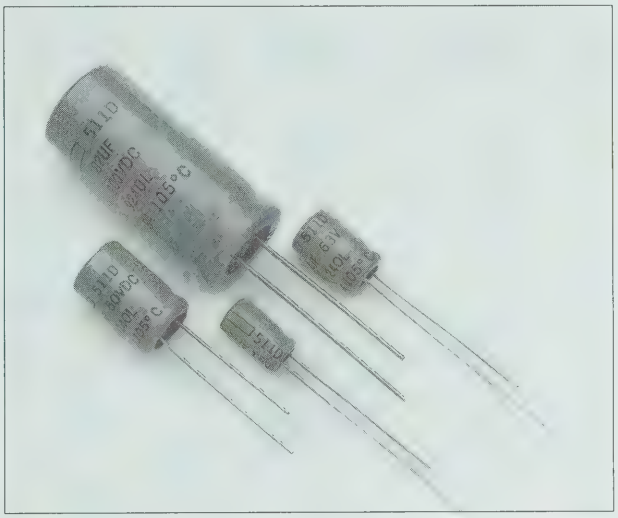
Dwg. No. A-14,743

TYPE 510DX — 2200μF @ 16VDC, ER CASE SIZE



Dwg. No. A-14,741

+105°C General Purpose Miniature Radial Lead, Aluminum Capacitors



L65-02

Features —

- Increased Capacitance
- New 18mm Diameter Case Size
- 3rd Lead Optional on Diameters ≥ 12.5mm
- Resin End Seal Available

General Specifications —

Operating Temperature: −40°C to +105°C.

Voltage Range: 6.3 - 250 VDC.

Capacitance Range: 1μF - 10,000μF.

Capacitance Tolerance: ±20%.

Case Size Range: 6 x 11mm - 18 x 36mm.

Termination: 2 or 3 radial leads.

Life Validation Test:
1000 hrs @ +105°C (dia. ≤ 8mm):
2000 hrs @ +105°C (dia. > 8mm):
Δ CAP ≤ 15% (6.3 - 16 VDC),
≤ 10% (25 - 250 VDC)
from initial measurement.
Δ ESR ≤ 1.2x initial specified limit.
Δ DCL ≤ initial specified limit.

Shelf Test: 500 hrs @ +105°C:
Δ CAP ≤ 10% initial measurement.
Δ ESR ≤ 1.2x initial specified limit.
Δ DCL ≤ 2x initial specified limit.

DC Leakage Current: @ +25°C
after 5 min. charge.

6.3 - 63 VDC	100-250 VDC
I = 0.005CV	I = 0.01 CV

I in μA, C in μF, V in Volts

Ripple Current Multipliers:

TEMPERATURE

Ambient Temp.	Multipliers
+105°C	0.45
+95°C	0.77
+85°C	1.0
+75°C	1.18
≤+65°C	1.34

FREQUENCY Hz.

VDC	50-60	100-120	300-400	1K-100K
6.3-25	0.85	1.0	1.05	1.1
26-250	0.80	1.0	1.30	1.4

Performance Characteristics —

SEE PAGE 2.

Catalog Numbering System

511D 157 M 6R3 AA 4 D

LEAD CODE. D = STRAIGHT LEADS (Standard).
E = LEAD FORM TO 5mm CENTERS.
J = 3 LEAD AXIAL MOUNT.*
O = KEYED POLARITY 3 LEAD RADIAL MOUNT.†
C = CUT LEADS.
V = SNAP IN FORMED LEADS.
I = TAPE AND REEL PACKAGING.
+ = TAPE AND AMMO PACK.

CASE STYLE. 2 = POLYESTER SLEEVE.
3 = PVC SLEEVE WITH RESIN SEAL.
(Required for exposure to halogenated cleaning solvents).
4 = PVC INSULATING SLEEVE (Standard).**
5 = POLYESTER SLEEVE WITH RESIN END SEAL.
(Required for exposure to halogenated cleaning solvents).

CASE CODE. SEE DIMENSIONS.

DC VOLTAGE RATING. IN VOLTS. AN 'R' IS USED AS A DECIMAL POINT.
FOR EXAMPLE: 6R3 = 6.3 VOLTS.

CAPACITANCE TOLERANCE. M = ±20%.

CAPACITANCE. EXPRESSED IN PICOFARADS. THE FIRST TWO DIGITS ARE SIGNIFICANT FIGURES, THE THIRD IS THE NUMBER OF ZEROS.

TYPE NUMBER. IDENTIFIES THE BASIC CAPACITOR DESIGN.

*Available for 12.5, 16 and 18mm dia. units.
**Sleeving rated to +105°C.
† Available for 12.5, 16 and 18mm dia. units with resin end seal.

DIMENSIONS IN MILLIMETERS

CASE CODE	NOMINAL DIAMETER	NOMINAL LENGTH	STYLES 2 and 4 D Max.	STYLES 2 and 4 L Max.	STYLES 3 and 5 D Max.	STYLES 3 and 5 L Max.	LEAD SPACING S, ±.6	LEAD SPACING T, ±.5	LEAD DIAMETER (d) NOM.	LEAD DIAMETER (d) AWG NO.	TYPICAL WEIGHT GRAMS
AA	6	11	6.5	12.0	6.5	13.0	2.5	N/A	0.63	22	0.6
BB	8	12	8.5	13.0	8.5	14.0	3.5	N/A	0.63	22	1.0
CC	10	13	10.5	14.3	10.5	16.0	5.0	N/A	0.63	22	1.7
CD	10	16	10.5	17.0	10.5	18.8	5.0	N/A	0.63	22	2.0
CG	10	20	10.5	21.5	10.5	23.0	5.0	N/A	0.63	22	2.5
DG	12.5	20	13.0	21.5	13.0	23.0	5.0	2.5	0.81	20	3.8
DK	12.5	25	13.0	26.5	13.0	29.0	5.0	2.5	0.81	20	4.5
DM	12.5	26.5	13.0	28.0	13.0	29.5	5.0	2.5	0.81	20	4.7
DT	12.5	33.5	13.0	34.2	13.0	36.0	5.0	2.5	0.81	20	5.8
DS	12.5	42.5	13.0	43.7	13.0	45.5	5.0	2.5	0.81	20	7.3
EK	16	25	16.5	26.2	16.5	27.9	7.5	3.8	0.81	20	7.2
EN	16	32	16.5	33.5	16.5	36.0	7.5	3.8	0.81	20	9.4
ER	16	36	16.5	37.5	16.5	40.0	7.5	3.8	0.81	20	10.6
EU	16	40	16.5	41.7	16.5	42.4	7.5	3.8	0.81	20	11.8
FR	18	36	18.5	37.5	18.5	40.0	7.5	3.8	0.81	20	13.4

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size (mm) D x L	Max. ESR @ +25°C (Ω) 120Hz	Max. ESR @ +25°C (Ω) 20k-40kHz	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-40kHz	Max. Impedance @ +25°C (Ω) 100kHz
6.3 VOLTS DC WORKING; 8 VOLTS DC SURGE							
150	511D157M6R3AA4D	6 x 11	3.130	2.720	0.123	0.132	2.800
270	511D277M6R3BB4D	8 x 12	1.518	1.100	0.219	0.257	1.270
560	511D567M6R3CC4D	10 x 13	0.710	0.650	0.383	0.400	0.670
820	511D827M6R3CD4D	10 x 16	0.520	0.400	0.481	0.548	0.400
1200	511D128M6R3CG4D	10 x 20	0.420	0.270	0.590	0.741	0.286
1800	511D188M6R3DG4D	12.5 x 20	0.300	0.190	0.802	1.010	0.200
2700	511D278M6R3DK4D	12.5 x 25	0.204	0.128	1.020	1.280	0.136
4700	511D478M6R3EK4D	16 x 25	0.121	0.075	1.580	2.010	0.090
6800	511D688M6R3EN4D	16 x 32	0.089	0.060	2.040	2.480	0.066
8200	511D828M6R3ER4D	16 x 36	0.078	0.055	2.280	2.720	0.062
10000	511D109M6R3FR4D	18 x 36	0.068	0.050	2.640	3.070	0.061
10 VOLTS DC WORKING; 13 VOLTS DC SURGE							
100	511D107M010AA4D	6 x 11	4.073	2.800	0.108	0.131	2.900
220	511D227M010BB4D	8 x 12	1.855	1.150	0.198	0.252	1.300
390	511D397M010CC4D	10 x 13	1.012	0.625	0.321	0.408	0.650
680	511D687M010CD4D	10 x 16	0.596	0.430	0.449	0.529	0.435
1000	511D108M010CG4D	10 x 20	0.407	0.290	0.603	0.715	0.290
1200	511D128M010DG4D	12.5 x 20	0.371	0.206	0.721	0.968	0.206
1800	511D188M010DK4D	12.5 x 25	0.265	0.138	0.930	1.280	0.138
3300	511D338M010EK4D	16 x 25	0.166	0.086	1.350	1.880	0.094
4700	511D478M010EN4D	16 x 32	0.122	0.060	1.740	2.480	0.067
5600	511D568M010ER4D	16 x 36	0.104	0.056	1.970	2.690	0.063
8200	511D828M010FR4D	18 x 36	0.094	0.056	2.240	2.910	0.063
16 VOLTS DC WORKING; 20 VOLTS DC SURGE							
82	511D826M016AA4D	6 x 11	4.294	2.940	0.106	0.127	2.950
150	511D157M016BB4D	8 x 12	2.433	1.250	0.173	0.241	1.250
270	511D277M016CC4D	10 x 13	1.081	0.685	0.310	0.390	0.680
470	511D477M016CD4D	10 x 16	0.748	0.442	0.419	0.522	0.442
680	511D687M016CG4D	10 x 20	0.521	0.295	0.533	0.709	0.295
820	511D827M016DG4D	12.5 x 20	0.429	0.208	0.671	0.963	0.208
1500	511D158M016DK4D	12.5 x 25	0.243	0.140	0.971	1.270	0.140
2200	511D228M016EK4D	16 x 25	0.176	0.090	1.310	1.840	0.098
3300	511D338M016EN4D	16 x 32	0.147	0.062	1.580	2.440	0.067
3900	511D398M016ER4D	16 x 36	0.125	0.058	1.800	2.650	0.063
5600	511D568M016FR4D	18 x 36	0.100	0.055	2.170	2.930	0.059
25 VOLTS DC WORKING; 32 VOLTS DC SURGE							
47	511D476M025AA4D	6 x 11	6.120	2.940	0.089	0.127	2.950
100	511D107M025BB4D	8 x 12	2.914	1.350	0.158	0.232	1.350
180	511D187M025CC4D	10 x 13	1.590	0.950	0.256	0.331	0.900
270	511D277M025CD4D	10 x 16	1.086	0.550	0.333	0.468	0.500
390	511D397M025CG4D	10 x 20	0.724	0.300	0.452	0.703	0.305
560	511D567M025DG4D	12.5 x 20	0.508	0.208	0.616	0.963	0.205
820	511D827M025DK4D	12.5 x 25	0.351	0.140	0.808	1.270	0.140
1200	511D128M025EK4D	16 x 25	0.239	0.110	1.127	1.660	0.105
1800	511D188M025EN4D	16 x 32	0.194	0.080	1.380	2.150	0.080
2200	511D228M025ER4D	16 x 36	0.162	0.064	1.580	2.520	0.074
3300	511D338M025FR4D	18 x 36	0.150	0.060	1.770	2.810	0.064
35 VOLTS DC WORKING; 44 VOLTS DC SURGE							
33	511D336M035AA4D	6 x 11	6.777	3.600	0.084	0.115	3.500
68	511D686M035BB4D	8 x 12	3.260	1.400	0.149	0.228	1.400
120	511D127M035CC4D	10 x 13	1.830	1.010	0.239	0.323	0.980

STANDARD RATINGS

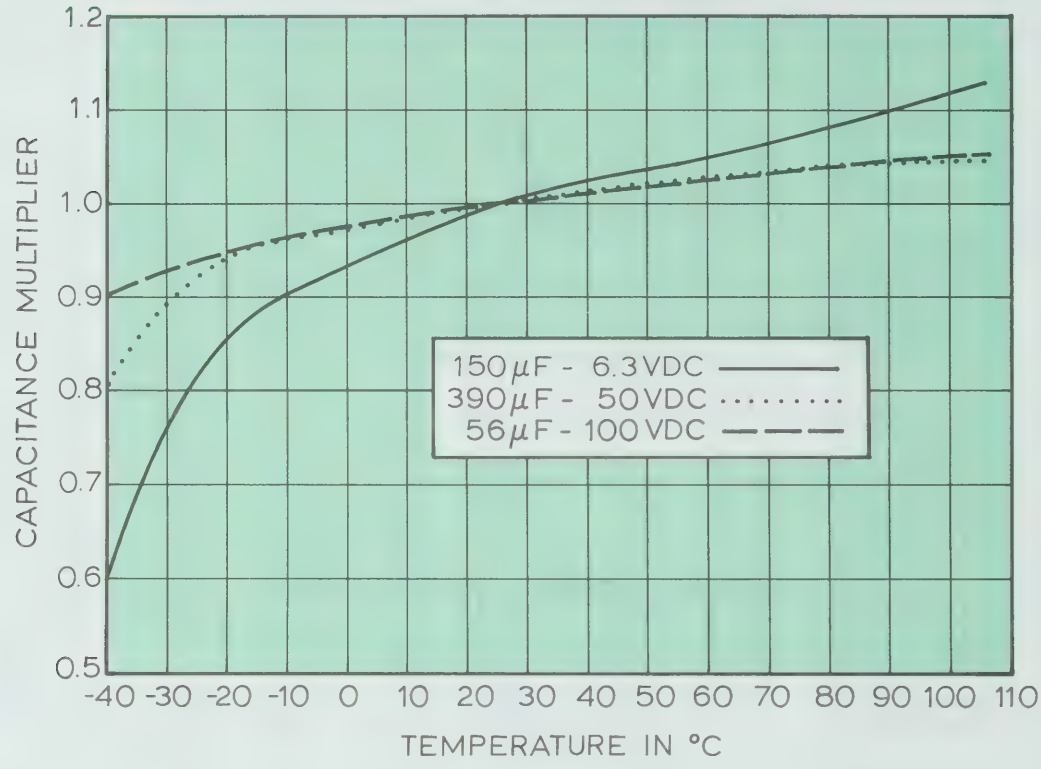
μF	Catalog Number	Nominal Case Size (mm) D x L	Max. ESR @ +25°C (Ω) 120Hz	Max. ESR @ +25°C (Ω) 20k-40kHz	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-40kHz	Max. Impedance @ +25°C (Ω) 100kHz
35 VOLTS DC WORKING; 44 VOLTS DC SURGE (Cont.)							
220	511D227M035CD4D	10 x 16	1.016	0.460	0.344	0.512	0.470
330	511D337M035CG4D	10 x 20	0.677	0.305	0.468	0.697	0.310
390	511D397M035DG4D	12.5 x 20	0.554	0.210	0.590	0.959	0.220
680	511D687M035DK4D	12.5 x 25	0.326	0.150	0.838	1.236	0.157
1000	511D108M035EK4D	16 x 25	0.223	0.110	1.170	1.660	0.112
1500	511D158M035EN4D	16 x 32	0.165	0.078	1.490	2.180	0.078
1800	511D188M035ER4D	16 x 32	0.132	0.060	1.760	2.610	0.062
2200	511D228M035FR4D	18 x 36	0.121	0.060	1.980	2.810	0.062
50 VOLTS DC WORKING; 63 VOLTS DC SURGE							
22	511D226M050AA4D	6 x 11	7.330	3.750	0.081	0.113	3.410
47	511D476M050BB4D	8 x 12	3.884	1.510	0.137	0.221	1.450
82	511D826M050CC4D	10 x 13	1.940	1.050	0.232	0.315	1.010
120	511D127M050CD4D	10 x 16	1.320	0.466	0.302	0.509	0.488
180	511D187M050CG4D	10 x 20	0.881	0.311	0.411	0.691	0.321
270	511D277M050DG4D	12.5 x 20	0.601	0.221	0.567	0.937	0.231
390	511D397M050DK4D	12.5 x 25	0.401	0.181	0.756	1.130	0.175
560	511D567M050EK4D	16 x 25	0.281	0.121	1.040	1.590	0.121
820	511D827M050EN4D	16 x 32	0.194	0.083	1.380	2.110	0.083
1000	511D108M050ER4D	16 x 36	0.161	0.065	1.590	2.510	0.068
1500	511D158M050FR4D	18 x 36	0.153	0.065	1.760	2.710	0.068
63 VOLTS DC WORKING; 79 VOLTS DC SURGE							
12	511D126M063AA4D	6 x 11	12.010	4.010	0.064	0.109	3.810
27	511D276M063BB4D	8 x 12	5.450	1.610	0.116	0.214	1.510
47	511D476M063CC4D	10 x 13	3.076	1.170	0.184	0.299	1.110
82	511D826M063CD4D	10 x 16	1.760	0.501	0.262	0.491	0.511
150	511D157M063CG4D	10 x 20	1.010	0.331	0.385	0.671	0.341
150	511D157M063DG4D	12.5 x 20	1.010	0.250	0.439	0.879	0.255
270	511D277M063DK4D	12.5 x 25	0.345	0.201	0.815	1.070	0.211
470	511D477M063EK4D	16 x 25	0.307	0.125	0.995	1.560	0.125
680	511D687M063EN4D	16 x 32	0.214	0.101	1.320	1.930	0.101
820	511D827M063ER4D	16 x 36	0.176	0.071	1.520	2.410	0.072
1200	511D128M063FR4D	18 x 36	0.165	0.065	1.690	2.710	0.068
100 VOLTS DC WORKING; 125 VOLTS DC SURGE							
4.7	511D475M100AA4D	6 x 11	30.79	4.310	0.041	0.106	4.21
10	511D106M100BB4D	8 x 12	14.63	1.810	0.071	0.202	1.71
18	511D186M100CC4D	10 x 13	8.01	1.250	0.114	0.289	1.25
33	511D336M100CD4D	10 x 16	4.44	0.531	0.165	0.477	0.531
56	511D566M100CG4D	10 x 20	2.55	0.351	0.241	0.651	0.351
56	511D566M100DG4D	12.5 x 20	2.55	0.265	0.276	0.854	0.265
120	511D127M100DK4D	12.5 x 25	1.21	0.215	0.437	1.03	0.215
180	511D187M100EK4D	16 x 25	0.801	0.134	0.616	1.51	0.134
270	511D277M100EN4D	16 x 32	0.545	0.108	0.824	1.85	0.108
330	511D337M100ER4D	16 x 36	0.444	0.076	0.958	2.32	0.078
847	511D477M100FR4D	18 x 36	0.361	0.071	1.15	2.61	0.074
160 VOLTS DC WORKING; 185 VOLTS DC SURGE							
1.8	511D185M160AA4D	6 x 11	88.01	27.010	0.023	0.042	26.010
3.9	511D395M160BB4D	8 x 12	40.01	12.250	0.043	0.077	12.010
6.8	511D685M160CC4D	10 x 13	23.57	7.310	0.067	0.119	7.310
10	511D106M160CD4D	10 x 16	16.09	4.910	0.086	0.157	4.910
15	511D156M160CG4D	10 x 20	11.01	3.610	0.116	0.203	3.610

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size (mm) D x L	Max. ESR @ +25°C (Ω) 120Hz	Max. ESR @ +25°C (Ω) 20k-40kHz	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-40kHz	Max. Impedance @ +25°C (Ω) 100kHz
160 VOLTS DC WORKING; 185 VOLTS DC SURGE (Cont.)							
22	511D226M160DG4D	12.5 x 20	7.33	3.210	0.162	0.245	3.210
33	511D336M160DK4D	12.5 x 25	4.88	2.250	0.216	0.319	2.250
56	511D566M160EK4D	16 x 25	2.81	1.210	0.329	0.501	1.210
68	511D686M160EN4D	16 x 32	2.35	0.721	0.396	0.717	0.721
100	511D107M160ER4D	16 x 36	1.61	0.531	0.504	0.876	0.531
120	511D127M160FR4D	18 x 36	1.32	0.471	0.598	1.01	0.481
200 VOLTS DC WORKING; 225 VOLTS DC SURGE							
1.5	511D155M200AA4D	6 x 11	110.010	33.110	0.021	0.038	33.010
3.3	511D335M200BB4D	8 x 12	48.810	14.010	0.039	0.072	13.900
5.6	511D565M200CC4D	10 x 13	28.080	8.410	0.061	0.111	8.410
8.2	511D825M200CD4D	10 x 16	19.410	4.910	0.078	0.156	4.910
12	511D126M200CG4D	10 x 20	13.210	3.610	0.106	0.203	3.610
22	511D226M200DG4D	12.5 x 20	7.330	3.210	0.162	0.245	3.210
33	511D336M200DK4D	12.5 x 25	4.880	2.250	0.216	0.319	2.250
47	511D476M200EK4D	16 x 25	3.384	1.210	0.299	0.501	1.210
68	511D686M200EN4D	16 x 32	2.350	0.721	0.396	0.717	0.721
82	511D826M200ER4D	16 x 36	1.940	0.531	0.458	0.876	0.531
120	511D127M200FR4D	18 x 36	1.420	0.481	0.577	0.991	0.491
250 VOLTS DC WORKING; 275 VOLTS DC SURGE							
1.2	511D125M250AA4D	6 x 11	132.010	34.910	0.019	0.037	34.010
2.7	511D275M250AB4D	8 x 12	60.010	15.910	0.035	0.067	15.010
3.9	511D395M250CC4D	10 x 13	40.010	10.610	0.051	0.099	10.010
6.8	511D685M250CD4D	10 x 16	23.570	5.010	0.071	0.155	5.010
10	511D106M250CG4D	10 x 20	16.090	3.760	0.096	0.198	3.760
12	511D126M250DG4D	12.5 x 20	13.200	3.220	0.121	0.245	3.220
18	511D186M250DK4D	12.5 x 25	8.810	2.250	0.161	0.319	2.250
33	511D336M250EK4D	16 x 25	4.880	1.270	0.249	0.489	1.270
47	511D476M250EN4D	16 x 32	3.380	0.721	0.331	0.717	0.721
56	511D566M250ER4D	16 x 32	2.080	0.531	0.381	0.867	0.531
82	511D826M250FR4D	18 x 36	1.940	0.491	0.493	0.983	0.501

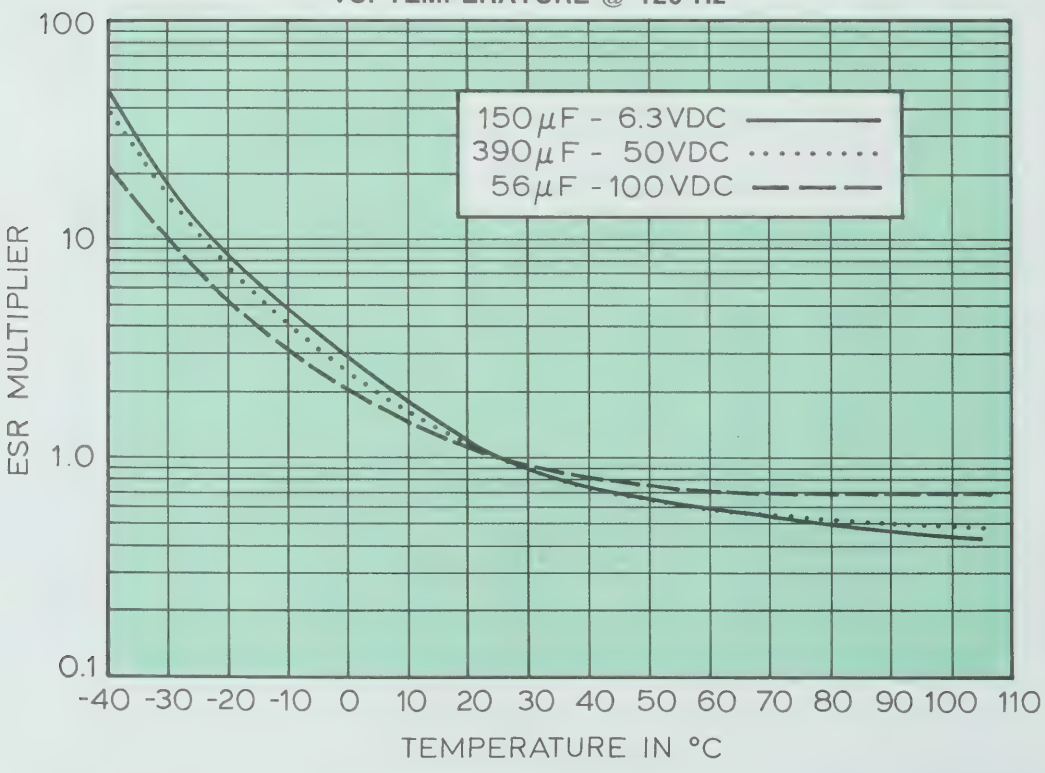
TYPICAL CURVES

TYPE 511D — TYPICAL CAPACITANCE MULTIPLIER
VS. TEMPERATURE @ 120 Hz



Dwg. No. A-14,779

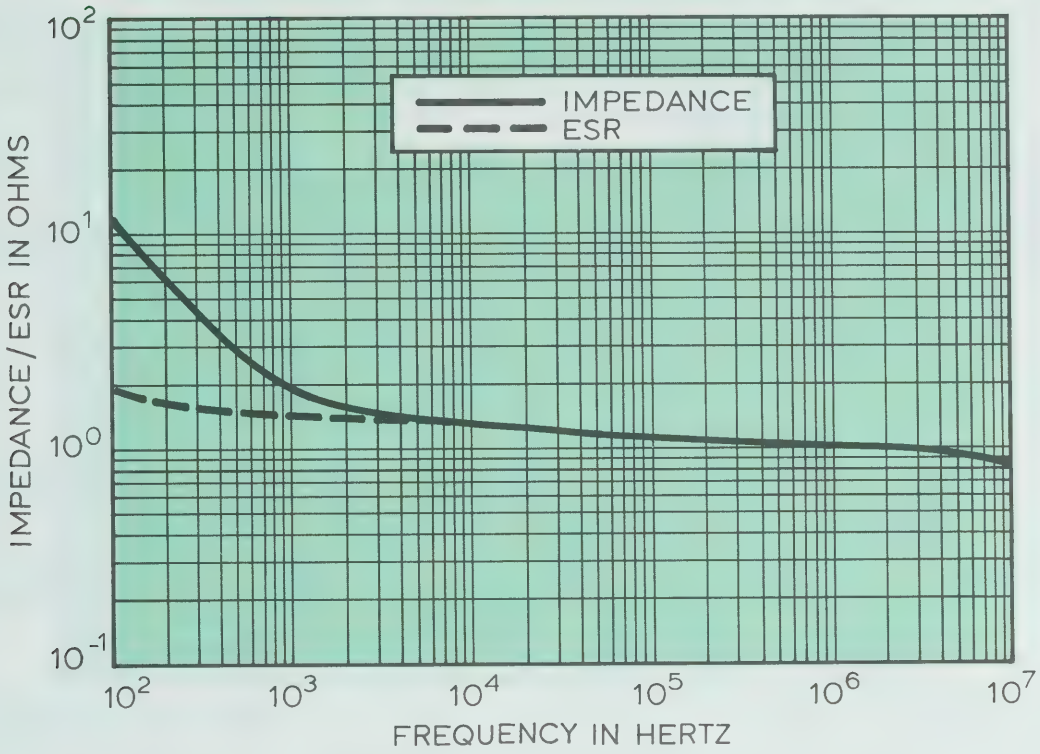
TYPE 511D — TYPICAL ESR MULTIPLIER
VS. TEMPERATURE @ 120 Hz



Dwg. No. A-14,778

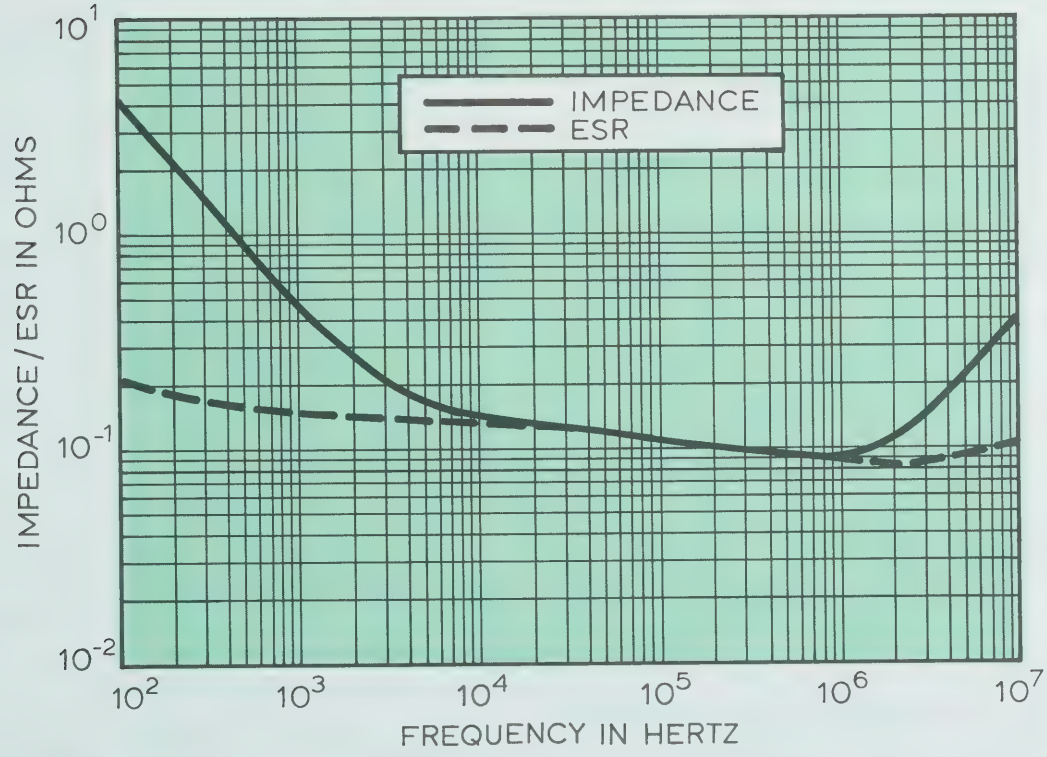
TYPICAL CURVES @ +25°C

TYPE 511D — 150μF @ 6.3VDC, AA CASE SIZE



Dwg. No. A-14,739

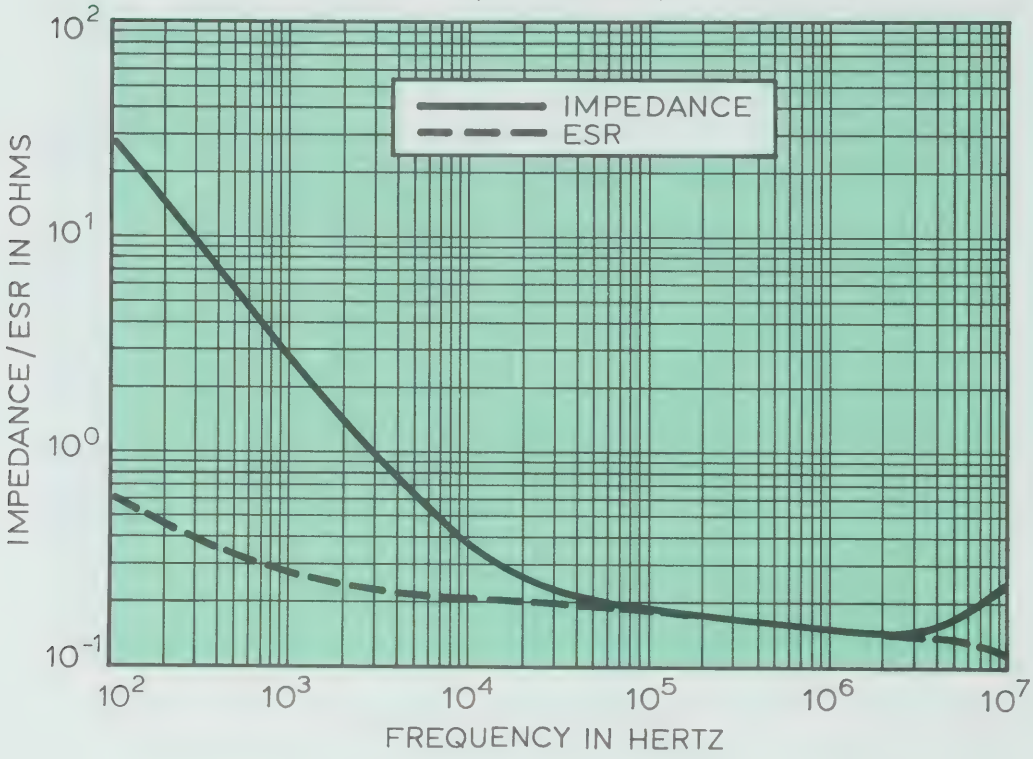
TYPE 511D — 390μF @ 50VDC, DK CASE SIZE



Dwg. No. A-14,737

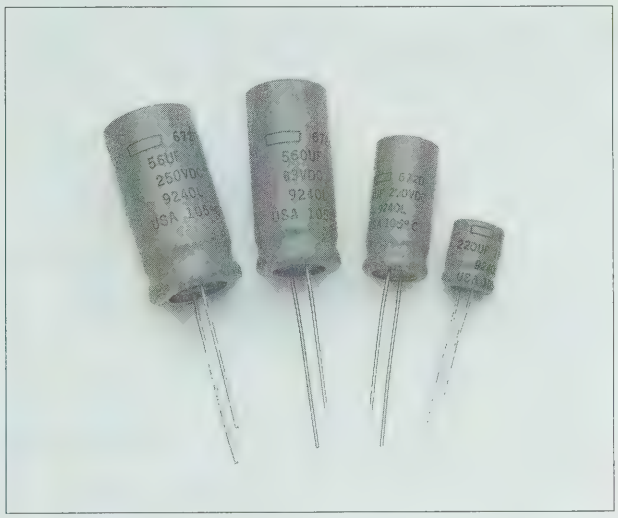
TYPICAL CURVES @ +25°C

TYPE 511D — 56μF @ 100VDC, CG CASE SIZE



Dwg. No. A-14,738

+105°C Miniature, Radial Lead, Aluminum Capacitors



L65-03

Features —

- **Wide Temperature Range**
- **Improved SMPS Output Capacitors**
- **High CV**
- **Optional 3rd Lead for Radial and Axial Style Mounting**

General Specifications —

Operating Temperature:
−55°C to +105°C.

Voltage Range: 6.3 - 63 VDC — 678D.
75 - 250 VDC — 672D.

Capacitance Range: 2.7μF - 10,000μF.

Capacitance Tolerance:
−10%, +50% — 672D; ±20% — 678D.

Case Size Range: 10 x 13mm to 18 x 40mm.

Termination: 2 and 3 lead radial and axial mount.

Life Validation Test:
4000 hrs @ +105°C (≥13mm dia.):
3000 hrs @ +105°C (10mm dia.)
- Δ CAP ≤ 20% from individual measurements.
- Δ ESR ≤ 1.15x initial specified limit. (V > 63V)
  1.3x initial specified limit (V ≤ 63V)
- Δ DCL ≤ initial specified limit.

Shelf Test: 500 hrs. @ +105°C:
- Δ CAP ≤ 10% from initial measurement. (≤ 20% 6.3 - 25V)
- Δ ESR ≤ 1.15x initial specified limit. (V > 63V)
  1.3x initial specified limit (V ≤ 63V)
- Δ DCL ≤ 2x initial specified limit, (≤ 3x initial specified limit 150-250 VDC).

DC Leakage Current: 2 mins. charge time.
I = 0.01 CV @ +25°C
I in μA, C in μF, V in Volts

Ripple Current Multipliers:

Ambient Temp.	Multipliers
+105°C	0.5
+95°C	0.77
+85°C	1.0
+75°C	1.25
≤+65°C	1.34

FREQUENCY Hz.

VDC	50-60	100-120	300-400	1K-19K	20K-200K
6.3-75	0.60	0.70	0.75	0.80	1.0
76-100	0.45	0.55	0.70	0.80	1.0
101-250	0.25	0.35	0.45	0.65	1.0

Low Temperature Performance:
Capacitance Ratio $C^{-55°C}/C^{+25°C}$ min. @ 120Hz.

	VOLTAGE	MULTIPLIER
Max Capacitance Change	6.3-16	0.75
	25-63	0.85
	63-100	0.75
	150-250	0.70

	VOLTAGE	MULTIPLIER
Max Impedance Change	6.3-16	2.5
	25-63	1.5
	100	2.5
	150-250	2.0

Performance Characteristics —

SEE PAGE 2.

Catalog Numbering System

678D 477 M 6R3 CC 4 D

LEAD CODE. D = STRAIGHT LEADS (Standard).
J = 3 LEAD AXIAL MOUNT.*
O = KEYED POLARITY 3 LEAD RADIAL MOUNT.**
V = SNAP IN FORMED LEADS.
I = TAPE AND REEL PACKAGING.

CASE STYLE. 2 = POLYESTER SLEEVE.
3 = PVC SLEEVE WITH RESIN SEAL.
(Required for exposure to halogenated cleaning solvents).
4 = PVC INSULATING SLEEVE (Standard).
5 = POLYESTER SLEEVE WITH RESIN END SEAL.
(Required for exposure to halogenated cleaning solvents).

CASE CODE. SEE DIMENSIONS.

DC VOLTAGE RATING. IN VOLTS. 'R' INDICATES A DECIMAL POINT.
FOR EXAMPLE, 6R3 = 6.3 VOLTS.

CAPACITANCE TOLERANCE. M = ±20% (678D)
F = −10%, +50% (672D)

CAPACITANCE. EXPRESSED IN PICOFARADS. THE FIRST TWO DIGITS ARE SIGNIFICANT FIGURES, THE THIRD IS THE NUMBER OF ZEROS.

TYPE NUMBER. IDENTIFIES THE BASIC CAPACITOR DESIGN.
678D — 6.3-63VDC
672D — 100-250VDC

*Available for 12.5, 16 and 18mm dia. units.
**Available for 12.5, 16 and 18mm dia. units with resin end seal.

DIMENSIONS IN MILLIMETERS

CASE CODE	NOMINAL DIAMETER	NOMINAL LENGTH	STYLES 2 and 4 D Max.	STYLES 2 and 4 L Max.	STYLES 3 and 5 D Max.	STYLES 3 and 5 L Max.	LEAD SPACING S, ±.6	LEAD SPACING T, ±.5	LEAD DIAMETER (d) NOM.	LEAD DIAMETER (d) AWG NO.	TYPICAL WEIGHT GRAMS
CC	10	13	10.5	14.3	10.5	16.0	5.0	N/A	0.63	22	1.7
CD	10	16	10.5	17.0	10.5	18.8	5.0	N/A	0.63	22	2.0
CG	10	20	10.5	21.5	10.5	23.0	5.0	N/A	0.63	22	2.5
DG	12.5	20	13.0	21.5	13.0	23.0	5.0	2.5	0.81	20	3.8
DK	12.5	25	13.0	26.5	13.0	29.0	5.0	2.5	0.81	20	4.5
DM	12.5	26.5	13.0	28.0	13.0	29.5	5.0	2.5	0.81	20	4.7
DT	12.5	33.5	13.0	34.2	13.0	36.0	5.0	2.5	0.81	20	5.8
DS	12.5	42.5	13.0	43.7	13.0	45.5	5.0	2.5	0.81	20	7.3
EK	16	25	16.5	26.2	16.5	27.9	7.5	3.8	0.81	20	7.2
EN	16	32	16.5	33.5	16.5	36.0	7.5	3.8	0.81	20	9.4
ER	16	36	16.5	37.5	16.5	40.0	7.5	3.8	0.81	20	10.6
EU	16	40	16.5	41.7	16.5	42.4	7.5	3.8	0.81	20	11.8
FR	18	36	18.5	37.5	18.5	40.0	7.5	3.8	0.81	20	13.4
FV	18	40	18.5	42.0	18.5	43.0	7.5	3.8	0.81	20	14.9

STANDARD RATINGS

µF	Catalog Number	Nominal Case Size (mm) D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-40kHz	Max. Ripple Current @ 20kHz-100kHz and +85°C (A)	Max. Impedance @ 100kHz and +25° (mΩ)
6.3 VOLTS DC WORKING; 9 VOLTS DC SURGE						
470	678D477M6R3CC4D	10 x 13	0.540	0.213	0.80	0.213
680	678D687M6R3CD4D	10 x 16	0.340	0.133	1.09	0.132
1000	678D108M6R3CG4D	10 x 20	0.230	0.090	1.45	0.093
1500	678D158M6R3DG4D	12.5 x 20	0.200	0.071	1.85	0.070
2200	678D228M6R3DM4D	12.5 x 26.5	0.110	0.060	1.63	0.059
3300	678D338M6R3DT4D	12.5 x 33.5	0.091	0.057	2.30	0.056
3900	678D398M6R3EK4D	16 x 25	0.110	0.041	3.04	0.045
4700	678D478M6R3DS4D	12.5 x 42.5	0.067	0.031	3.74	0.032
5600	678D568M6R3EN4D	16 x 32	0.078	0.037	3.53	0.040
6800	678D688M6R3ER4D	16 x 36	0.069	0.034	3.67	0.037
8200	678D828M6R3EU4D	16 x 40	0.059	0.031	4.18	0.034
8200	678D828M6R3FR4D	18 x 36	0.066	0.029	4.52	0.031
10000	678D109M6R3FV4D	18 x 40	0.054	0.024	5.21	0.026
10 VOLTS DC WORKING; 13 VOLTS DC SURGE						
330	678D337M010CC4D	10 x 13	0.550	0.215	0.80	0.215
560	678D567M010CD4D	10 x 16	0.350	0.135	1.03	0.134
820	678D827M010CG4D	10 x 20	0.235	0.092	1.41	0.090
1000	678D108M010DG4D	12.5 x 20	0.215	0.077	1.79	0.079
1500	678D158M010DK4D	12.5 x 25	0.200	0.064	1.90	0.062
1800	678D188M010DM4D	12.5 x 26.5	0.120	0.062	2.19	0.061
2700	678D278M010DT4D	12.5 x 33.5	0.111	0.059	2.28	0.060
2700	678D278M010EK4D	16 x 25	0.115	0.042	3.40	0.046
3300	678D338M010DS4D	12.5 x 42.5	0.075	0.032	3.69	0.033
4700	678D478M010EN4D	16 x 32	0.085	0.038	3.49	0.041
5600	678D568M010ER4D	16 x 36	0.078	0.033	3.62	0.036
6800	678D688M010FR4D	18 x 36	0.070	0.031	4.41	0.033
8200	678D828M010FV4D	18 x 40	0.060	0.026	5.01	0.028
16 VOLTS DC WORKING; 20 VOLTS DC SURGE						
220	678D227M016CC4D	10 x 13	0.585	0.217	0.89	0.217
390	678D397M016CD4D	10 x 16	0.370	0.137	1.16	0.136
560	678D567M016CG4D	10 x 20	0.250	0.098	1.56	0.094
820	678D827M016DG4D	12.5 x 20	0.215	0.085	1.79	0.085
1200	678D128M016DM4D	12.5 x 26.5	0.130	0.066	2.24	0.065
1800	678D188M016DT4D	12.5 x 33.5	0.121	0.055	2.77	0.054
2200	678D228M016EK4D	16 x 25	0.120	0.042	3.02	0.046
2700	678D278M016DS4D	12.5 x 42.5	0.080	0.032	3.67	0.034
3300	678D338M016EN4D	16 x 32	0.078	0.032	3.78	0.034
3900	678D398M016ER4D	16 x 36	0.074	0.032	3.98	0.034
4700	678D478M016FR4D	18 x 36	0.074	0.032	4.34	0.034
5600	678D568M016FV4D	18 x 40	0.061	0.026	4.99	0.028
25 VOLTS DC WORKING; 35 VOLTS DC SURGE						
120	678D127M025CC4D	10 x 13	0.700	0.250	0.71	0.250
220	678D227M025CD4D	10 x 16	0.489	0.187	1.00	0.186
330	678D337M025CG4D	10 x 20	0.300	0.105	1.32	0.100
390	678D397M025DG4D	12.5 x 20	0.265	0.092	1.54	0.092
560	678D567M025DK4D	12.5 x 25	0.193	0.075	1.79	0.076
680	678D687M025DM4D	12.5 x 26.5	0.160	0.067	2.17	0.068
1000	678D108M025DT4D	12.5 x 33.5	0.151	0.056	2.68	0.058

STANDARD RATINGS

µF	Catalog Number	Nominal Case Size (mm) D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-40kHz	Max. Ripple Current @ 20kHz-100kHz and +85°C (A)	Max. Impedance @ 100kHz and +25° (mΩ)
25 VOLTS DC WORKING; 35 VOLTS DC SURGE (Cont.)						
1200	678D128M025EK4D	16 x 25	0.132	0.045	2.93	0.047
1200	678D128M025DS4D	12.5 x 42.5	0.090	0.034	3.58	0.036
1500	678D158M025EN4D	16 x 32	0.095	0.039	3.44	0.041
1800	678D188M025ER4D	16 x 36	0.074	0.032	3.98	0.034
2200	678D228M025EU4D	16 x 40	0.720	0.031	4.14	0.033
2200	678D228M025FR4D	18 x 36	0.700	0.030	4.34	0.032
2700	678D278M025FV4D	18 x 40	0.062	0.026	4.97	0.028
35 VOLTS DC WORKING; 50 VOLTS DC SURGE						
82	678D826M035CC4D	10 x 13	0.950	0.265	0.62	0.265
150	678D157M035CD4D	10 x 16	0.580	0.165	0.85	0.165
220	678D227M035CG4D	10 x 20	0.250	0.098	1.56	0.094
270	678D277M035DG4D	12.5 x 20	0.248	0.094	1.61	0.093
390	678D397M035DK4D	12.5 x 25	0.233	0.089	1.72	0.090
470	678D477M035DM4D	12.5 x 26.5	0.200	0.068	2.08	0.070
680	678D687M035DT4D	12.5 x 33.5	0.190	0.059	2.46	0.059
820	678D827M035EK4D	16 x 25	0.133	0.046	2.86	0.050
820	678D827M035DS4D	12.5 x 42.5	0.093	0.035	3.51	0.037
1200	678D128M035EN4D	16 x 32	0.099	0.041	3.71	0.042
1500	678D158M035ER4D	16 x 36	0.080	0.033	3.94	0.035
1800	678D188M035FR4D	18 x 36	0.079	0.033	4.25	0.034
50 VOLTS DC WORKING; 75 VOLTS DC SURGE						
39	678D396M050CC4D	10 x 13	1.250	0.275	0.62	0.275
68	678D686M050CD4D	10 x 16	0.933	0.178	0.76	0.179
100	678D107M050CG4D	10 x 20	0.520	0.115	1.27	0.112
120	678D127M050DG4D	12.5 x 20	0.390	0.139	1.34	0.141
180	678D187M050DK4D	12.5 x 25	0.261	0.090	1.61	0.092
220	678D227M050DM4D	12.5 x 26.5	0.240	0.069	2.08	0.071
330	678D337M050DT4D	12.5 x 33.5	0.219	0.063	2.24	0.066
390	678D397M050EK4D	16 x 25	0.150	0.048	2.82	0.052
470	678D477M050DS4D	12.5 x 42.5	0.110	0.036	3.47	0.039
560	678D567M050EN4D	16 x 32	0.118	0.041	3.36	0.043
680	678D687M050ER4D	16 x 36	0.102	0.040	3.69	0.042
820	678D827M050EU4D	16 x 40	0.094	0.038	3.80	0.040
820	678D827M050FR4D	18 x 36	0.089	0.036	4.07	0.038
1000	678D108M050FV4D	18 x 40	0.077	0.028	4.81	0.032
63 VOLTS DC WORKING; 80 VOLTS DC SURGE						
39	678D396M063CC4D	10 x 13	1.600	0.288	0.60	0.288
56	678D566M063CD4D	10 x 16	1.000	0.180	0.82	0.180
82	678D826M063CG4D	10 x 20	0.611	0.120	1.34	0.120
120	678D127M063DG4D	12.5 x 20	0.450	0.093	1.61	0.090
180	678D187M063DK4D	12.5 x 25	0.298	0.090	1.83	0.091
270	678D277M063DT4D	12.5 x 33.5	0.160	0.055	2.46	0.054
330	678D337M063EK4D	16 x 25	0.170	0.050	2.75	0.054
390	678D397M063DS4D	12.5 x 42.5	0.130	0.038	3.38	0.040
470	678D477M063EN4D	16 x 32	0.140	0.043	3.29	0.045
560	678D567M063ER4D	16 x 36	0.120	0.035	3.80	0.038
680	678D687M063EU4D	16 x 40	0.113	0.032	3.87	0.035
680	678D687M063FR4D	18 x 36	0.102	0.029	4.18	0.032
820	678D827M063FV4D	18 x 40	0.090	0.029	4.74	0.033

STANDARD RATINGS

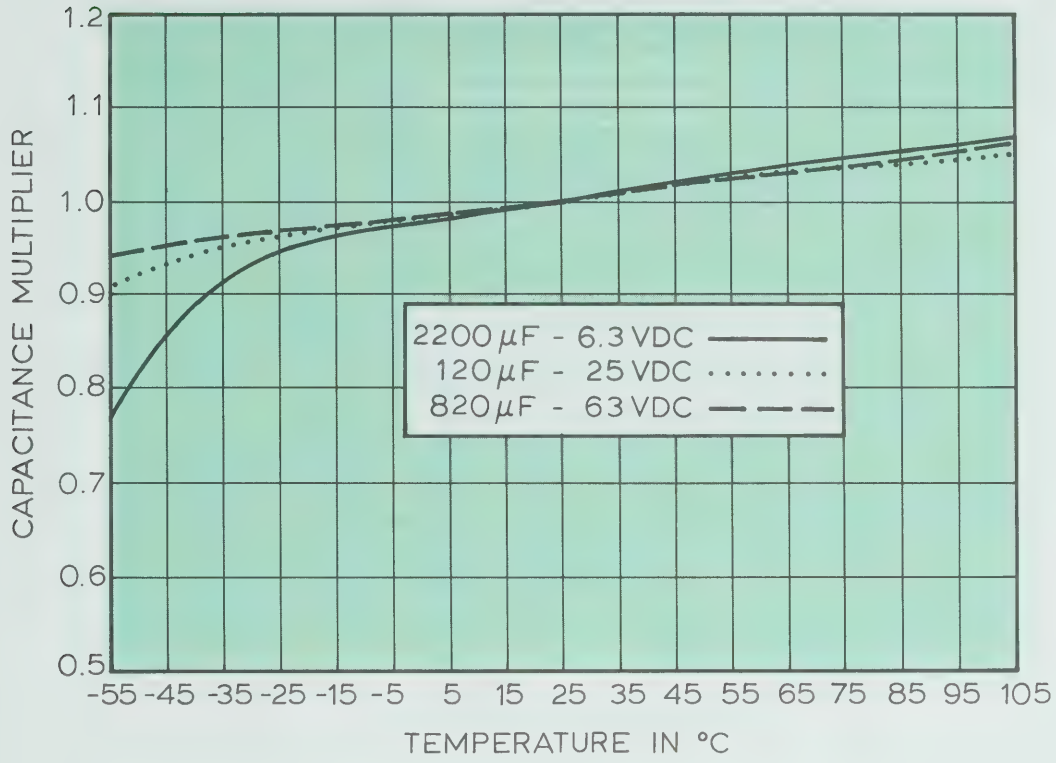
µF	Catalog Number	Nominal Case Size (mm) D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-40kHz	Max. Ripple Current @ 20kHz-100kHz and +85°C (A)	Max. Impedance @ 100kHz and +25° (mΩ)
100 VOLTS DC WORKING; 125 VOLTS DC SURGE						
12	672D126F100CC4D	10 x 13	12.300	3.100	0.20	2.600
22	672D226F100CD4D	10 x 16	10.00	2.300	0.26	1.800
33	672D336F100CG4D	10 x 20	7.660	1.940	0.35	1.760
47	672D476F100DG4D	12.5 x 20	5.930	1.170	0.48	0.980
68	672D686F100DM4D	12.5 x 26.5	2.550	0.550	0.72	0.390
100	672D107F100DT4D	12.5 x 33.5	1.970	0.050	0.80	0.330
120	672D127F100EK4D	16 x 25	1.200	0.310	1.05	0.260
150	672D157F100DS4D	12.5 x 42.5	0.940	0.270	1.22	0.220
180	672D187F100EN4D	16 x 32	0.680	0.190	1.50	0.170
220	672D227F100ER4D	16 x 36	0.660	0.180	1.65	0.170
270	672D277F100EU4D	16 x 40	0.580	0.160	1.81	0.160
330	672D337F100FR4D	18 x 36	0.550	0.140	1.82	0.140
390	672D397F100FV4D	18 x 40	0.520	0.120	2.10	0.120
160 VOLTS DC WORKING; 200 VOLTS DC SURGE						
4.7	672D475F160CC4D	10 x 13	49.550	4.160	0.13	3.890
6.8	672D685F160CD4D	10 x 16	33.600	2.580	0.20	2.080
10	672D106F160CG4D	10 x 20	20.000	2.000	0.31	1.750
15	672D156F160DG4D	12.5 x 20	17.400	1.450	0.41	1.250
22	672D226F160DK4D	12.5 x 25	12.800	0.960	0.52	0.830
27	672D276F160DM4D	12.5 x 26.5	9.700	0.720	0.66	0.640
39	672D396F160DT4D	12.5 x 33.5	6.200	0.600	0.75	0.520
47	672D476F160EK4D	16 x 25	6.000	0.620	0.70	0.590
56	672D566F160DS4D	12.5 x 42.5	5.100	0.500	0.90	0.480
68	672D686F160EN4D	16 x 32	3.500	0.350	1.15	0.280
82	672D826F160ER4D	16 x 36	2.950	0.320	1.53	0.230
100	672D107F160FR4D	18 x 36	2.540	0.210	1.65	0.190
120	672D127F160FV4D	18 x 40	2.000	0.190	1.80	0.160
200 VOLTS DC WORKING; 250 VOLTS DC SURGE						
3.3	672D335F200CC4D	10 x 13	58.000	4.550	0.12	4.190
4.7	672D475F200CD4D	10 x 16	41.600	2.870	0.19	2.350
6.8	672D685F200CG4D	10 x 20	22.500	1.950	0.31	1.750
10	672D106F200DG4D	12.5 x 20	19.900	1.780	0.39	1.580
15	672D156F200DK4D	12.5 x 25	15.100	1.270	0.50	1.050
18	672D186F200DM4D	12.5 x 26.5	10.600	0.960	0.63	0.880
22	672D226F200DT4D	12.5 x 33.5	7.000	0.580	0.76	0.550
27	672D276F200EK4D	16 x 25	6.500	0.650	0.68	0.610
33	672D336F200DS4D	12.5 x 42.5	5.990	0.550	0.87	0.590
39	672D396F200EN4D	16 x 32	3.900	0.340	1.16	0.300
47	672D476F200ER4D	16 x 36	3.730	0.330	1.50	0.290
56	672D566F200EU4D	16 x 40	3.250	0.290	1.58	0.270
68	672D686F200FR4D	18 x 36	2.840	0.260	1.74	0.250
82	672D826F200FV4D	18 x 40	2.300	0.180	1.90	0.165

STANDARD RATINGS

µF	Catalog Number	Nominal Case Size (mm) D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-40kHz	Max. Ripple Current @ 20kHz-100kHz and +85°C (A)	Max. Impedance @ 100kHz and +25° (mΩ)
250 VOLTS DC WORKING; 300 VOLTS DC SURGE						
2.7	672D275F250CC4D	10 x 13	108.000	5.900	0.10	6.200
3.9	672D395F250CD4D	10 x 16	73.800	3.850	0.16	4.000
5.6	672D565F250CG4D	10 x 20	46.500	3.400	0.18	3.600
8.2	672D825F250DG4D	12.5 x 20	29.900	3.050	0.23	3.200
12	672D126F250DK4D	12.5 x 25	23.300	2.500	0.27	2.650
15	672D156F250DM4D	12.5 x 26.5	15.000	1.900	0.38	2.000
18	672D186F250DT4D	12.5 x 33.5	12.000	1.500	0.48	1.600
27	672D276F250EK4D	16 x 25	10.800	1.610	0.53	1.700
27	672D276F250DS4D	12.5 x 42.5	7.820	1.390	0.67	1.400
33	672D336F250EN4D	16 x 32	5.500	0.720	0.80	0.730
39	672D396F250ER4D	16 x 36	5.250	0.700	0.90	0.700
47	672D476F250EU4D	16 x 40	4.680	0.670	1.00	0.680
56	672D566F250FR4D	18 x 36	3.750	0.550	1.10	0.550
68	672D686F250FV4D	18 x 40	3.100	0.360	1.30	0.360

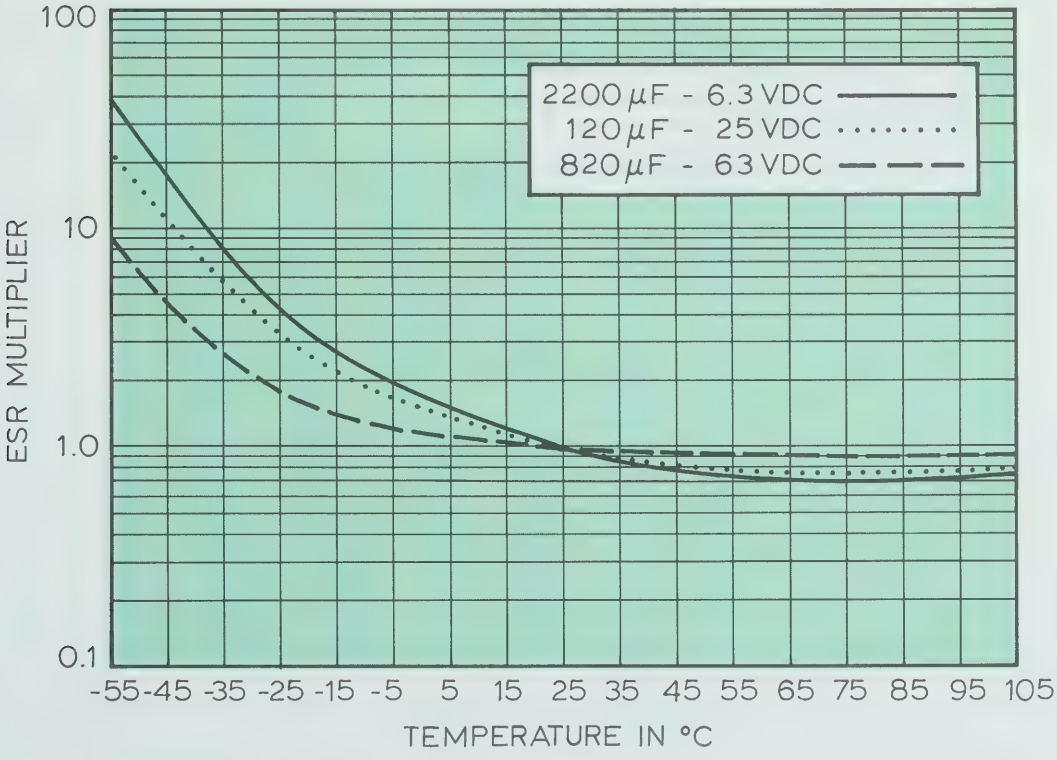
TYPICAL CURVES

TYPE 678D — TYPICAL CAPACITANCE MULTIPLIER
VS. TEMPERATURE @ 120 Hz



Dwg. No. A-14,770

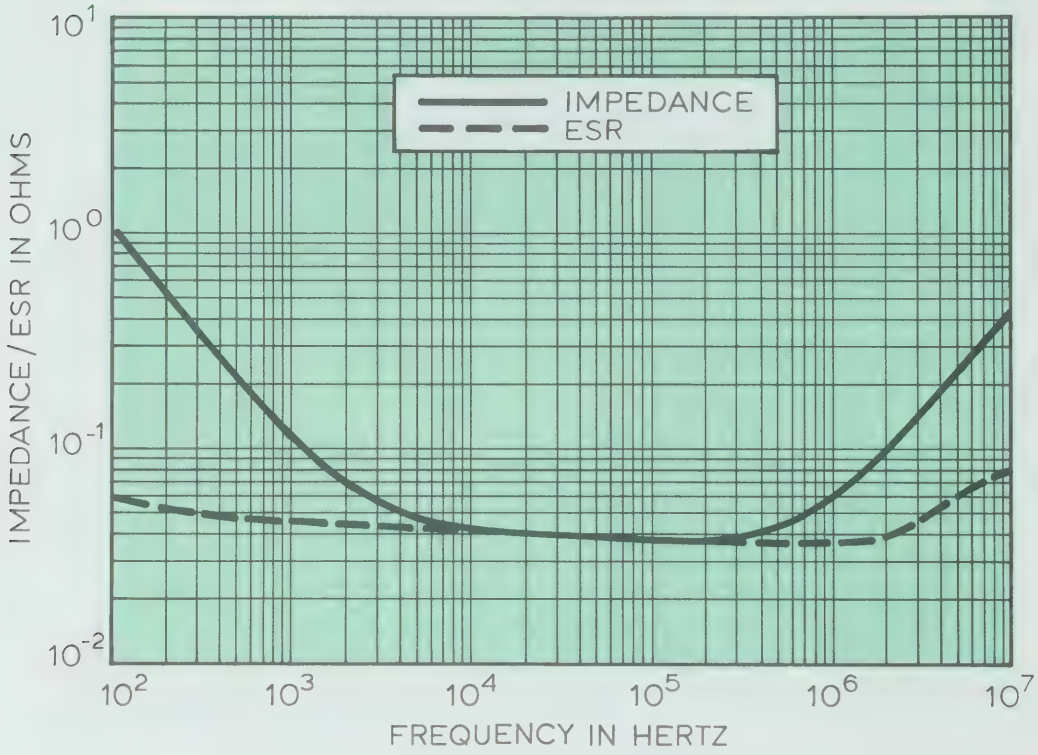
TYPE 678D — TYPICAL ESR MULTIPLIER
VS. TEMPERATURE @ 120 Hz



Dwg. No. A-14,769

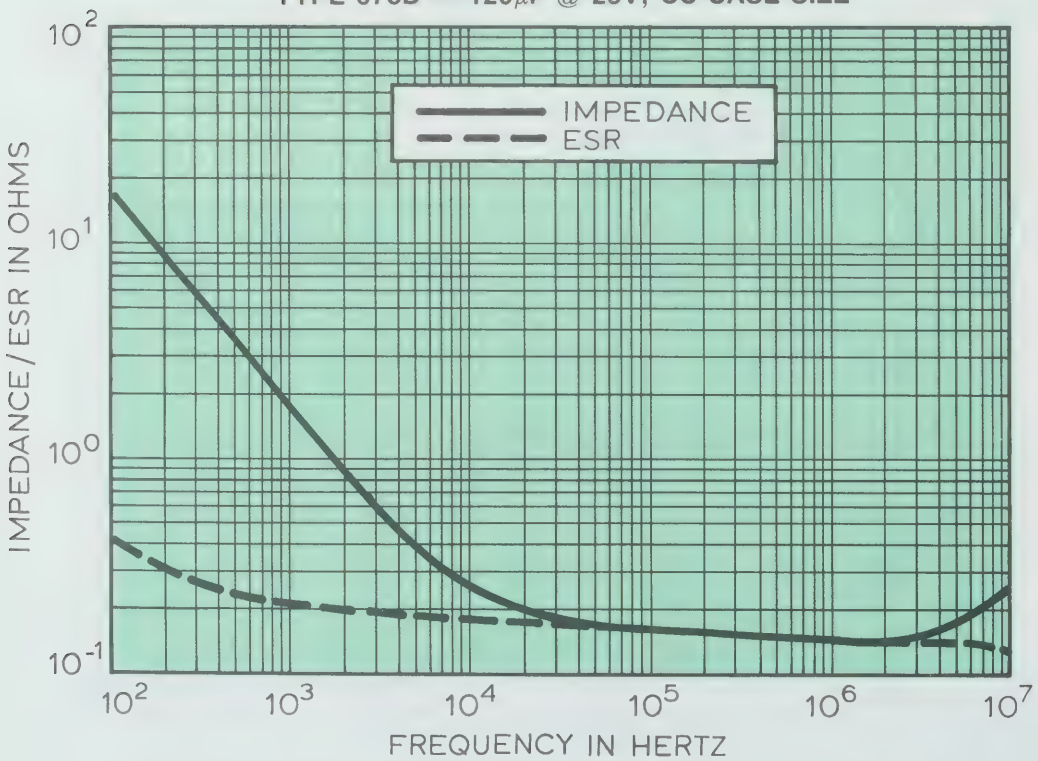
TYPICAL CURVES @ +25°C

TYPE 678D — 2200μF @ 6.3VDC, DM CASE SIZE



Dwg. No. A-14,712

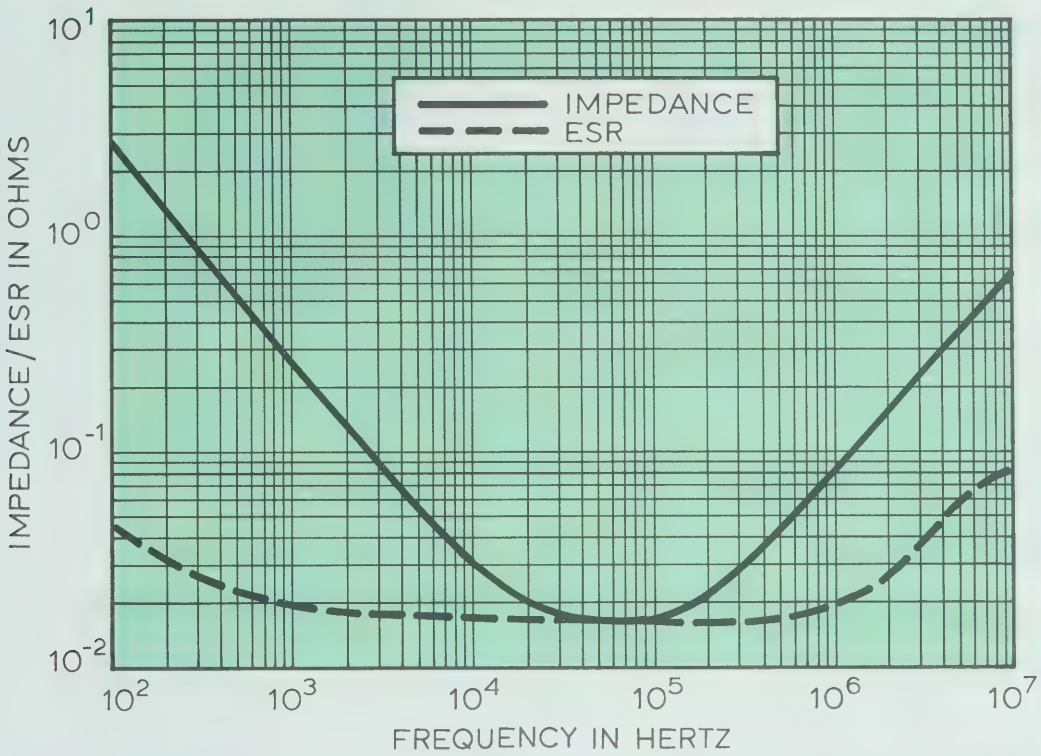
TYPE 678D — 120μF @ 25V, CC CASE SIZE



Dwg. No. A-14,711

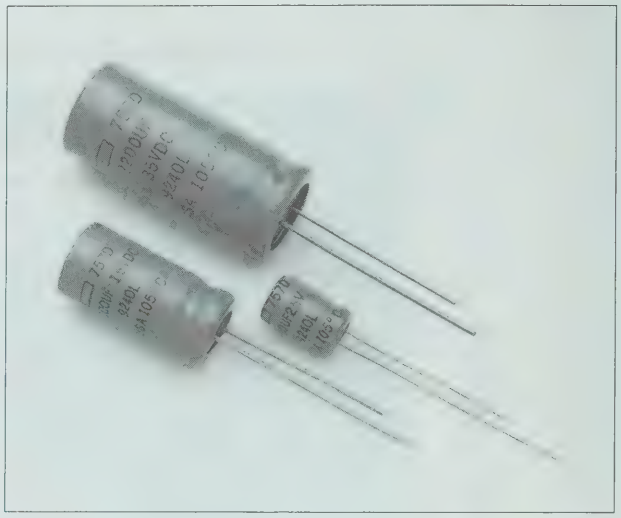
TYPICAL CURVES @ +25°C

TYPE 678D — 820μF @ 63VDC, FV CASE SIZE



Dwg. No. A-14,713

+105°C Miniature, Radial Lead Aluminum Capacitors



L65-07

Features —

- Low Impedance
- Low ESR
- High Ripple Current Capability
- High Capacitance
- Long Life and Stability

General Specifications —

Operating Temperature:
−55°C to +105°C.

Voltage Range: 6.3 - 35 VDC.

Capacitance Range: 120μF - 15,000μF.

Capacitance Tolerance: ±20%.

Case Size Range: 8 x 12mm - 18 x 40mm.

Termination: 2 and 3 lead radial and axial mount.

Life Validation Test:
5000 hrs @ +105°C
- Δ CAP ≤ 20% from initial measurement.
- Δ ESR ≤ 1.25x initial specified limit.
- Δ DCL ≤ initial specified limit.
- Δ Z ≤ 1.75x initial measurement.

Shelf Test: 1000 hrs. @ +105°C:
- Δ CAP ≤ 15% from initial measurement.
- Δ ESR ≤ 1.10x initial specified limit.
- Δ DCL ≤ initial specified limit.

DC Leakage Current: @ +25°C
I = 0.01 CV, 2 minutes charge time.
I in μA, C in μF, V in Volts

Ripple Current Multipliers:

TEMPERATURE

Ambient Temp.	Multipliers
+105°C	1.0
+85°C	1.73
+65°C	2.23
+45°C	2.64
+25°C	3.0

FREQUENCY Hz.

VDC	400	1K-19K	20K-200K
6.3-35	0.75	0.82	1.0

Low Temperature Performance:
Capacitance Ratio $C^{-55°C}/C^{+25°C}$ min. @ 120Hz.

	VOLTAGE	MULTIPLIER
Max Capacitance Change	6.3-35V	0.75

	VOLTAGE	120Hz	20 - 100kHz
Max Impedance Change	6.3-35V	4	40

Performance Characteristics —

SEE PAGE 2.

Catalog Numbering System

757D 477 M 6R3 BB 4 D

LEAD CODE. D = STRAIGHT LEADS (Standard).
J = 3 LEAD AXIAL MOUNT.*
O = KEYED POLARITY 3 LEAD RADIAL MOUNT.**
I = TAPE AND REEL PACKAGING.
(8 and 10mm dia. only)

CASE STYLE. 4 = PVC INSULATING SLEEVE (Standard).
2 = POLYESTER SLEEVE.
3 = PVC SLEEVE WITH RESIN SEAL.
(Required for exposure to halogenated cleaning solvents).
5 = POLYESTER SLEEVE WITH RESIN END SEAL.
(Required for exposure to halogenated cleaning solvents).

CASE CODE. SEE DIMENSIONS.

DC VOLTAGE RATING. IN VOLTS. 'R' INDICATES A DECIMAL POINT. FOR EXAMPLE, 6R3 = 6.3 VOLTS.

CAPACITANCE TOLERANCE. M = ±20%

CAPACITANCE. EXPRESSED IN PICOFARADS. THE FIRST TWO DIGITS ARE SIGNIFICANT FIGURES, THE THIRD IS THE NUMBER OF ZEROS.

TYPE NUMBER. IDENTIFIES THE BASIC CAPACITOR DESIGN.

*Available for 12.5, 16 and 18mm dia. units.
**Available for 12.5, 16 and 18mm dia. units with resin end seal.

DIMENSIONS IN MILLIMETERS

CASE CODE	NOMINAL DIAMETER	NOMINAL LENGTH	STYLES 4 and 2 D Max.	STYLES 4 and 2 L Max.	STYLES 3 and 5 D Max.	STYLES 3 and 5 L Max.	LEAD SPACING S, ±.6	LEAD SPACING T, ±.5	LEAD DIAMETER (d) NOM.	LEAD DIAMETER (d) AWG NO.	TYPICAL WEIGHT GRAMS
BB	8	12	8.5	13.0	8.5	14.0	3.5	N/A	0.63	22	1.0
CC	10	13	10.5	14.3	10.5	16.0	5.0	N/A	0.63	22	1.7
CD	10	16	10.5	17.0	10.5	18.8	5.0	N/A	0.63	22	2.0
CG	10	20	10.5	21.5	10.5	23.0	5.0	N/A	0.63	22	2.5
DG	12.5	20	13.0	21.5	13.0	23.0	5.0	2.5	0.81	20	3.8
DK	12.5	25	13.0	26.5	13.0	29.0	5.0	2.5	0.81	20	4.5
DT	12.5	33.5	13.0	34.2	13.0	36.0	5.0	2.5	0.81	20	5.8
DS	12.5	42.5	13.0	43.7	13.0	45.5	5.0	2.5	0.81	20	7.3
EK	16	25	16.5	26.2	16.5	27.9	7.5	3.8	0.81	20	7.2
EN	16	32	16.5	33.5	16.5	36.0	7.5	3.8	0.81	20	9.4
ER	16	36	16.5	37.5	16.5	40.0	7.5	3.8	0.81	20	10.6
EU	16	40	16.5	41.7	16.5	42.4	7.5	3.8	0.81	20	11.8
FR	18	36	18.5	37.5	18.5	40.0	7.5	3.8	0.81	20	13.4
FV	18	40	18.5	42.0	18.5	43.0	7.5	3.8	0.81	20	14.9

STANDARD RATINGS

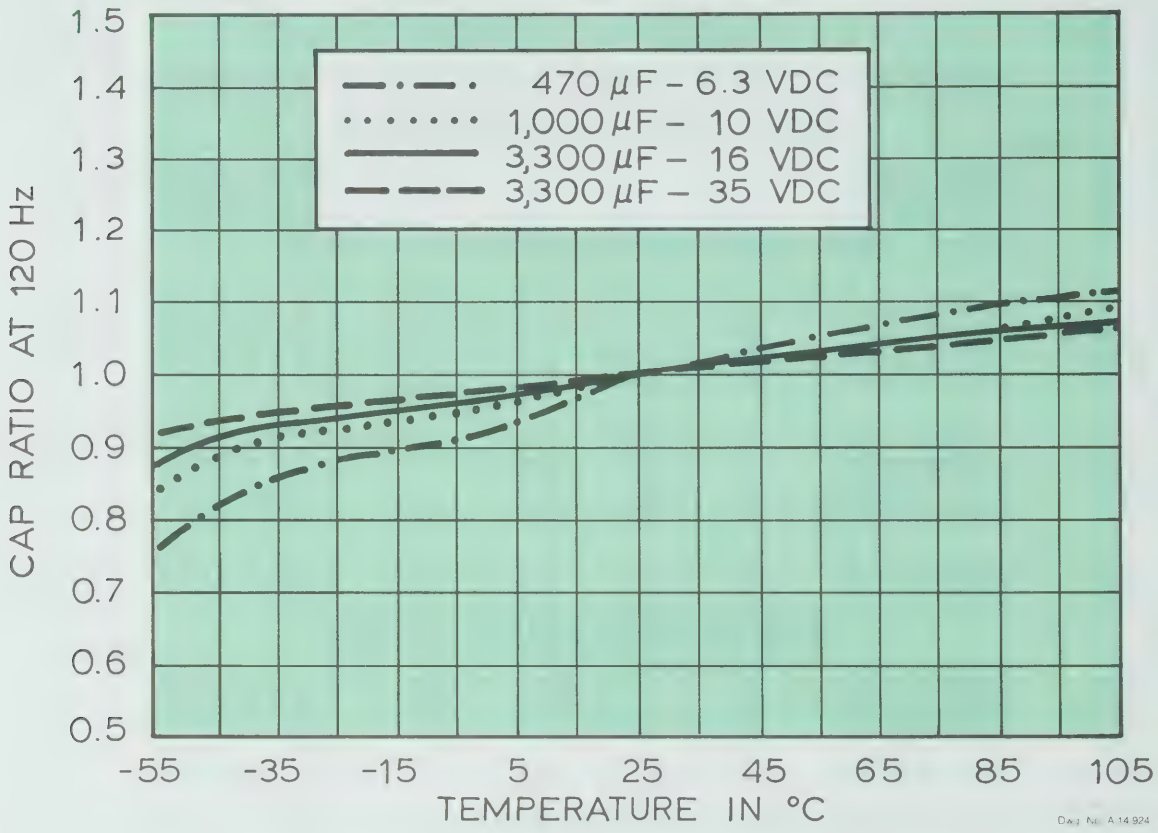
µF	Catalog Number	Nominal Case Size (inch) D x L	Max. ESR @ + 25°C (mΩ) 120Hz	Max. ESR @ + 25°C (mΩ) 20k-40kHz	Max. Ripple Current @ +105°C (A) 120Hz	Max. Ripple Current @ +105°C (A) 20k-40kHz	Max. Z @ +25°C (mΩ) 100kHz
6.3 VOLTS DC WORKING; 8 VOLTS DC SURGE							
470	757D477M6R3BB4D	8 x 12	523	163	.47	.658	198
680	757D687M6R3CC4D	10 x 13	310	98	.65	.907	120
820	757D827M6R3CD4D	10 x 16	194	77	.88	1.09	96
1200	757D128M6R3CG4D	10 x 20	130	53	1.20	1.47	65
2200	757D228M6R3DG4D	12.5 x 20	113	38	1.33	1.81	49
2700	757D278M6R3DK4D	12.5 x 25	76	31	1.78	2.18	40
3900	757D398M6R3DT4D	12.5 x 33.5	49	20	2.45	2.98	26
5600	757D568M6R3DS4D	12.5 x 42.5	34	17	3.26	3.61	21
5600	757D568M6R3EK4D	16 x 25	62	22	2.15	2.82	28
6800	757D688M6R3EN4D	16 x 32	43	19	2.84	3.35	24
8200	757D828M6R3ER4D	16 x 36	35	16	3.30	3.82	20
12000	757D129M6R3EU4D	16 x 40	31	14	3.63	4.24	18
12000	757D129M6R3FR4D	18 x 36	38	16.5	3.20	3.83	21
15000	757D159M6R3FV4D	18 x 40	32	15	3.68	4.28	19
10 VOLTS DC WORKING; 13 VOLTS DC SURGE							
330	757D337M010BB4D	8 x 12	576	163	.45	.658	198
470	757D477M010CC4D	10 x 13	340	98	.62	.907	120
560	757D567M010CD4D	10 x 16	212	77	.84	1.09	96
1000	757D108M010CG4D	10 x 20	142	53	1.14	1.47	65
1800	757D188M010DG4D	12.5 x 20	123	38	1.28	1.81	49
2200	757D228M010DK4D	12.5 x 25	82	31	1.71	2.18	40
2700	757D278M010DT4D	12.5 x 33.5	53	20	2.35	2.98	26
3900	757D398M010DS4D	12.5 x 42.5	37	17	3.13	3.61	21
3900	757D398M010EK4D	16 x 25	66	22	2.15	2.82	28
5600	757D568M010EN4D	16 x 32	45	19	2.77	3.35	24
6800	757D688M010ER4D	16 x 36	37	16	3.22	3.82	20
8200	757D828M010EU4D	16 x 40	33	14	3.54	4.24	18
8200	757D828M010FR4D	18 x 36	40	16.5	3.14	3.83	21
10000	757D109M010FV4D	18 x 40	33	15	3.61	4.28	19
16 VOLTS DC WORKING; 20 VOLTS DC SURGE							
270	757D277M016BB4D	8 x 12	703	163	.40	.658	198
330	757D337M016CC4D	10 x 13	410	98	.56	.907	120
390	757D397M016CD2D	10 x 16	257	77	.77	1.09	96
680	757D687M016CG4D	10 x 20	171	53	1.04	1.47	65
1200	757D128M016DG4D	12.5 x 20	145	38	1.26	1.81	49
1500	757D158M016DK4D	12.5 x 25	97	31	1.57	2.18	45
2200	757D228M016DT4D	12.5 x 33.5	62	20	2.17	2.98	26
3300	757D338M016DS4D	12.5 x 42.5	43	17	2.88	3.61	21
2700	757D278M016EK4D	16 x 25	74	22	2.15	2.82	28
3900	757D398M016EN4D	16 x 32	51	19	2.61	3.35	24
4700	757D478M016ER4D	16 x 36	41	16	3.04	3.82	20
5600	757D568M016EU4D	16 x 40	37	14	3.34	4.24	18
6800	757D688M016FR4D	18 x 36	44	16.5	3.01	3.83	21
8200	757D828M016FV4D	18 x 40	36	15	3.45	4.28	19

STANDARD RATINGS

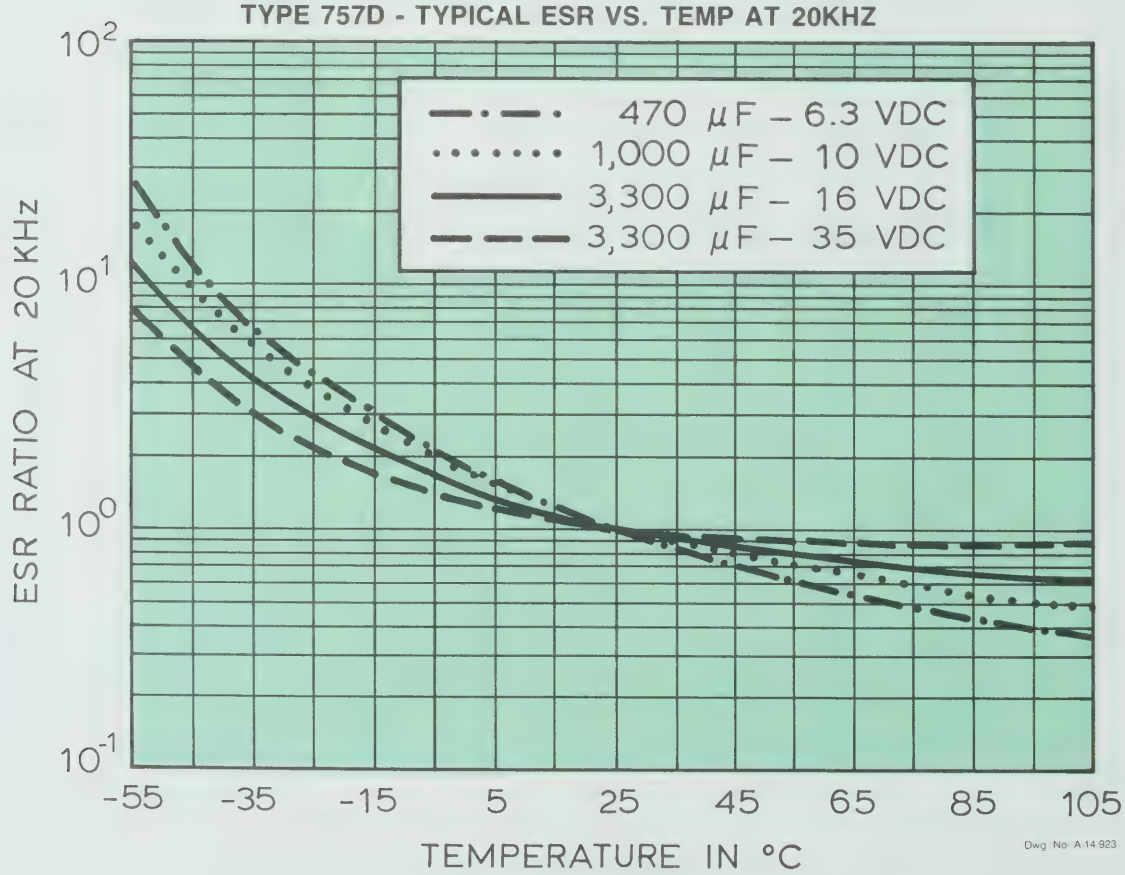
µF	Catalog Number	Nominal Case Size (inch) D x L	Max. ESR @ + 25°C (mΩ) 120Hz	Max. ESR @ + 25°C (mΩ) 20k-40kHz	Max. Ripple Current @ +105°C (A) 120Hz	Max. Ripple Current @ +105°C (A) 20k-40kHz	Max. Z @ +25°C (mΩ) 100kHz
25 VOLTS DC WORKING; 32 VOLTS DC SURGE							
180	757D187M025BB4D	8 x 12	851	163	.37	.658	198
220	757D227M025CC4D	10 x 13	493	98	.51	.907	120
270	757D277M025CD4D	10 x 16	308	77	.70	1.09	96
470	757D477M025CG4D	10 x 20	206	53	.95	1.47	65
820	757D827M025DG4D	12.5 x 20	171	38	1.12	1.81	49
1000	757D108M025DK4D	12.5 x 25	114	31	1.45	2.18	40
1500	757D158M025DT4D	12.5 x 33.5	73	20	1.99	2.98	26
2200	757D228M025DS4D	12.5 x 42.5	51	17	2.66	3.61	21
1800	757D188M025EK4D	16 x 25	83	22	2.15	2.82	28
2700	757D278M025EN4D	16 x 32	57	19	2.46	3.35	24
3300	757D338M025ER4D	16 x 36	47	16	2.87	3.82	20
3900	757D398M025EU4D	16 x 40	41	14	3.15	4.24	18
3900	757D398M025FR4D	18 x 36	48	16.5	2.87	3.83	21
4700	757D478M025FV4D	18 x 40	40	15	3.30	4.28	19
35 VOLTS DC WORKING; 44 VOLTS DC SURGE							
120	757D127M035BB4D	8 x 12	1073	163	.33	.658	198
150	757D157M035CC4D	10 x 13	617	98	.46	.907	120
180	757D187M035CD4D	10 x 16	386	77	.62	1.09	96
330	757D337M035CG4D	10 x 20	257	53	.85	1.47	65
560	757D567M036DG4D	12.5 x 20	210	38	1.12	1.81	49
680	757D687M035DK4D	12.5 x 25	140	31	1.35	2.18	40
1000	757D108M035DT4D	12.5 x 33.5	90	20	1.80	2.98	26
1500	757D158M035DS4D	12.5 x 42.5	63	17	2.40	3.61	21
1200	757D128M035EK4D	16 x 25	97	22	2.15	2.82	28
1800	757D188M035EN4D	16 x 32	67	19	2.28	3.35	24
2200	757D228M035ER4D	16 x 36	54	16	2.65	3.82	20
2700	757D278M035EU4D	16 x 40	48	14	2.92	4.24	18
2700	757D278M035FR4D	18 x 36	54	16.5	2.69	3.83	21
3300	757D338M035FV4D	18 x 40	45	15	3.09	4.28	19

TYPICAL CURVES

TYPE 757D - TYPICAL CAP VS. TEMP AT 120HZ

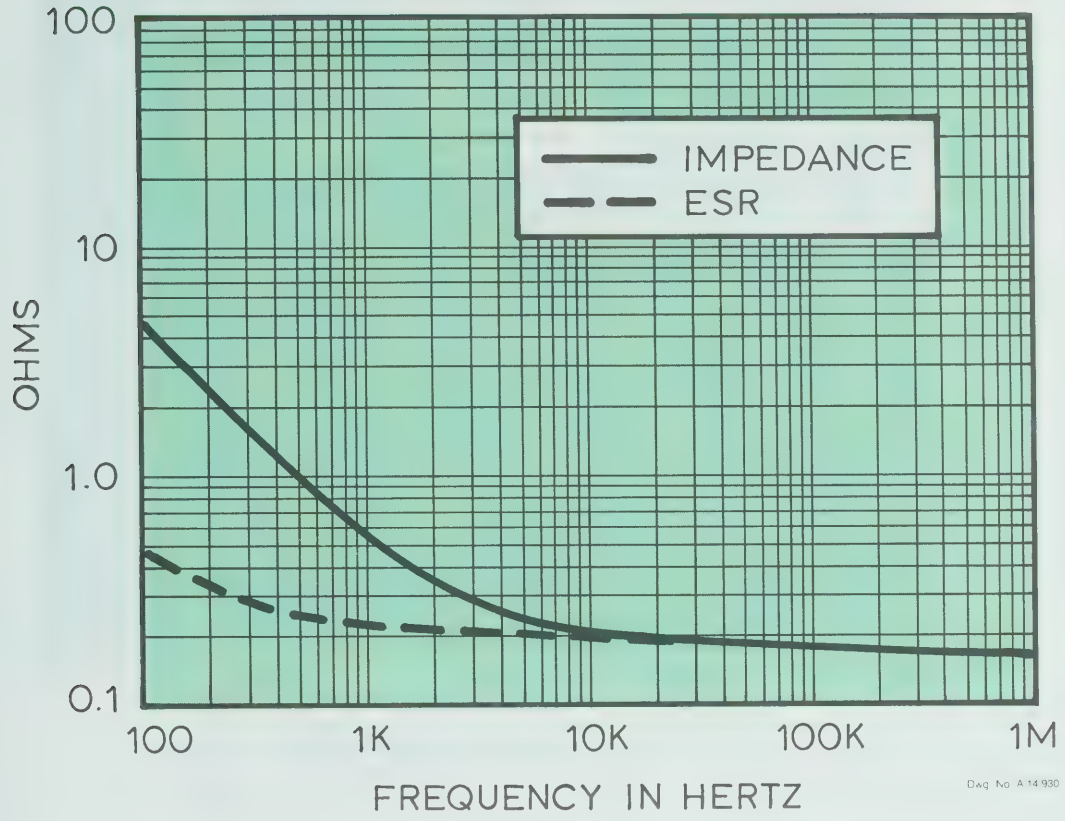


TYPE 757D - TYPICAL ESR VS. TEMP AT 20KHZ

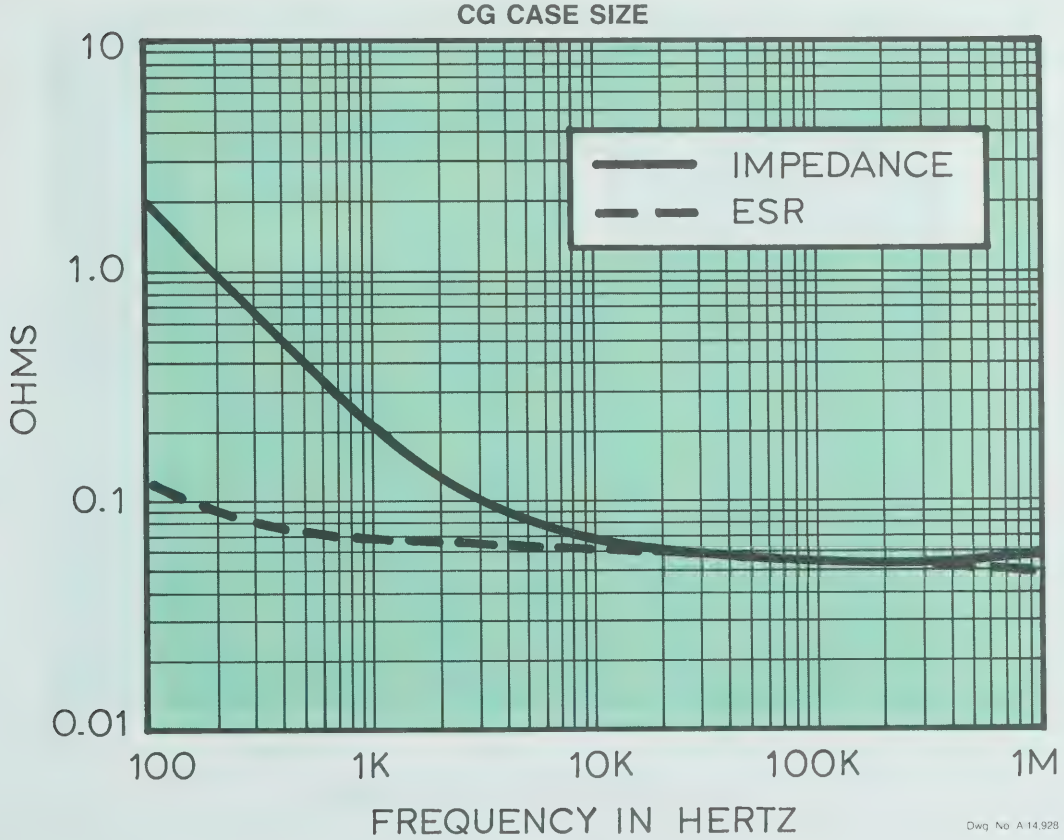


TYPICAL CURVES

BB CASE SIZE

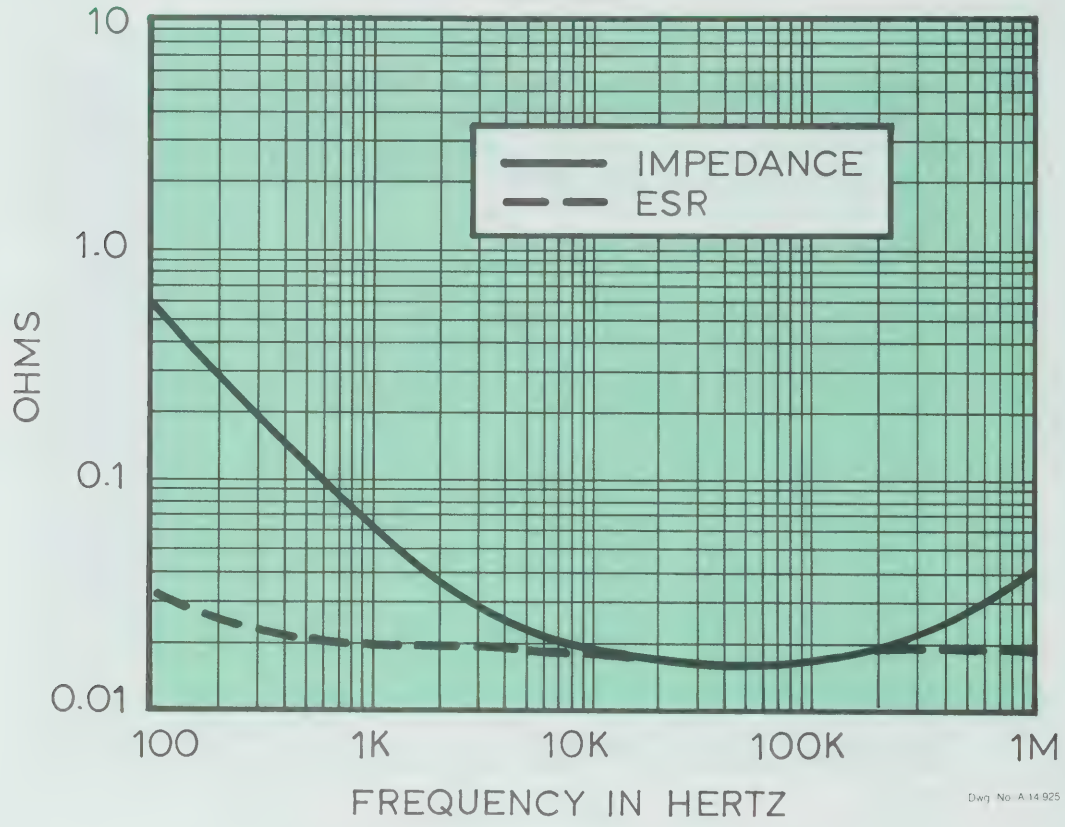


CG CASE SIZE

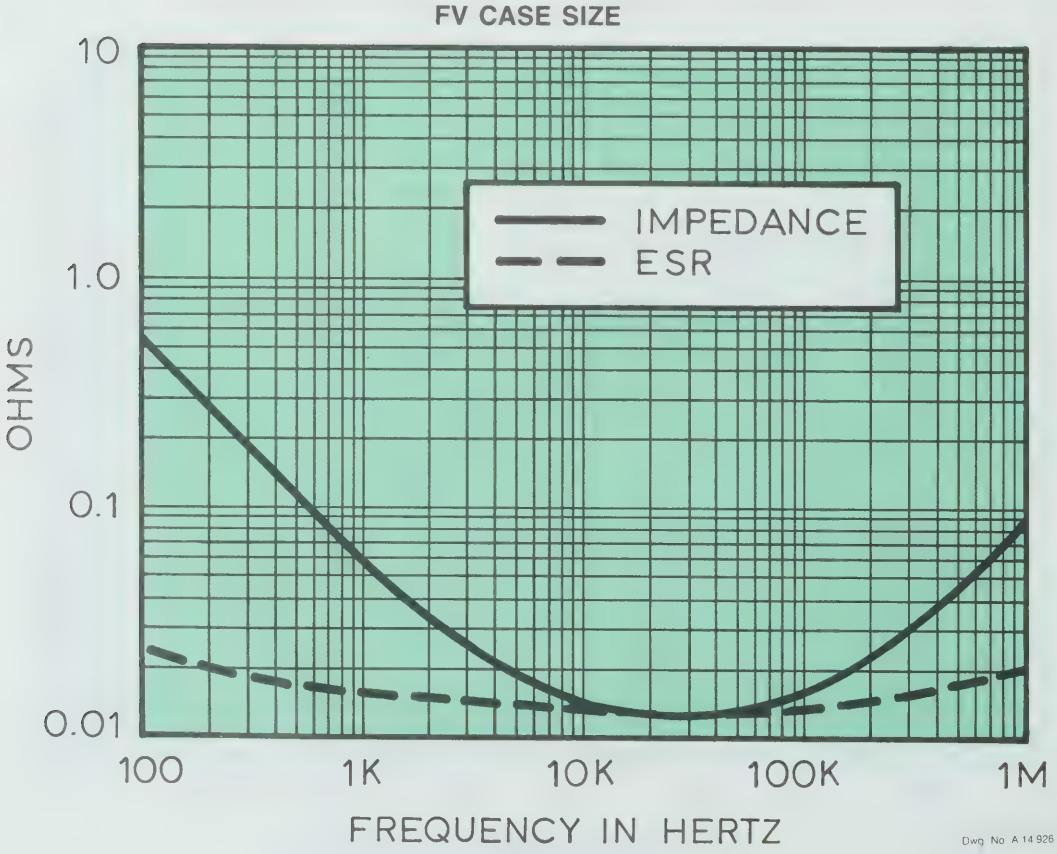


TYPICAL CURVES

DS CASE SIZE

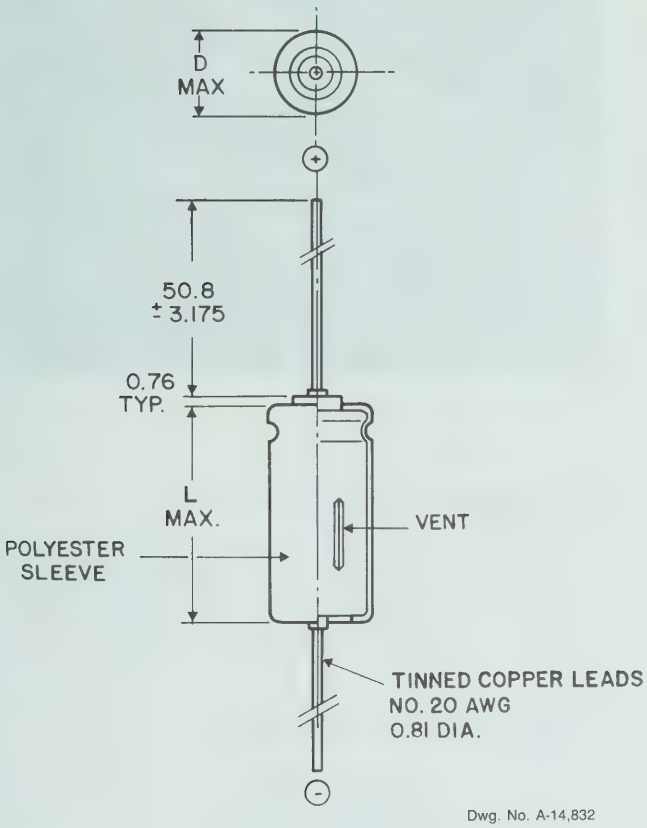


FV CASE SIZE



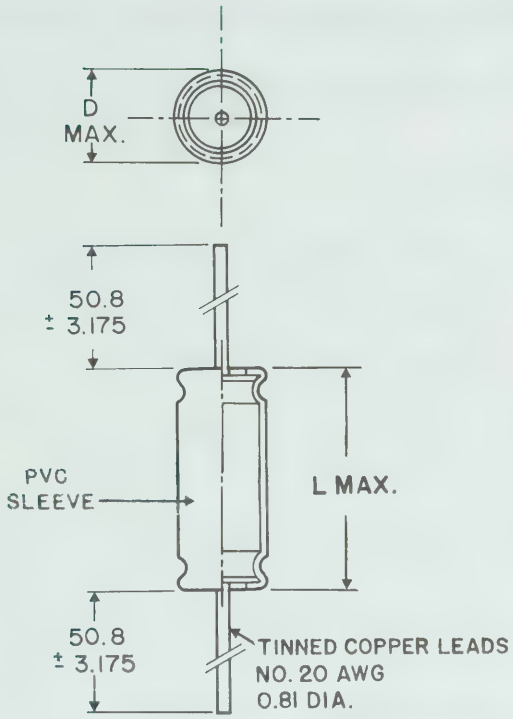
OUTLINE DRAWINGS
DIMENSIONS IN MILLIMETERS

TYPE 600D



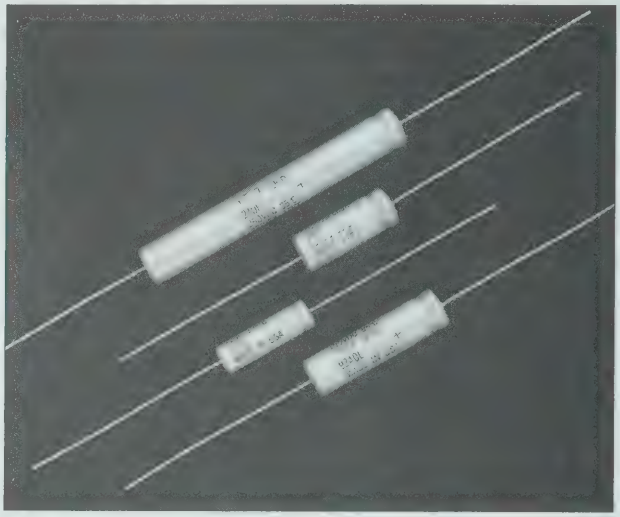
Dwg. No. A-14,832

TYPE 610D



Dwg. No. A-14,851

+125°C High Reliability Miniature Axial Lead Aluminum Capacitors


L65-06

Features —

- Extended Temperature Range
- Military Version — MIL-C-39018/01
- Foil Tantalum Replacement
- Unique Teflon End Seal for Long Life
- High Vibration Capability
- Life Test 2000 Hours @ +125°C

General Specifications —

Operating Temperature: −55°C to +125°C.

Voltage Range: 5 - 250 VDC.

Capacitance Range: 2.2μF - 2,700μF.

Capacitance Tolerance: −10%, +50%.

Case Size Range: 7 x 24mm - 9.5 x 68mm.

Termination: Axial leaded.

Life Validation Test: 2000 hrs @ +125°C:
Δ CAP ≤ 15% from initial measurement.
Δ ESR ≤ 1.3x initial specified limit.
Δ DCL ≤ initial specified limit.

Shelf Test: 500 hrs @ +125°C:
Δ CAP ≤ 10% from initial measurement.
Δ ESR ≤ 1.15x initial specified limit.
Δ DCL ≤ 2x initial specified limit.

DC Leakage Current: @ +25°C
5 min. charge time.

0 - 75 VDC	100-250 VDC
$I = .15\sqrt{CV}$	$I = .15\sqrt{CV} + 5$

I in μA, C in μF, V in Volts

Ripple Current Multipliers:

TEMPERATURE

Ambient Temp.	Multipliers
+125°C	1.0
+105°C	2.2
+85°C	3.0
+75°C or less	3.6

FREQUENCY Hz

VDC	50-60	100-120	300-400	>1000
0-30	0.85	1.00	1.04	1.08
31-250	0.80	1.00	1.30	1.40

Performance Characteristics —

SEE PAGE 2.

Catalog Numbering System

600D 227 F 005 KD 4

CASE STYLE. 0 = BARE CASE.
4 = POLYESTER INSULATING SLEEVE (Standard).
5 = POLYESTER SLEEVE WITH RESIN END SEAL.
(Required for exposure to halogenated cleaning solvents).

CASE CODE. SEE DIMENSIONS, BELOW.

DC VOLTAGE RATING. EXPRESSED IN VOLTS. WHERE NECESSARY, ZEROS ARE USED TO PRECEDE THE VOLTAGE RATING.

CAPACITANCE TOLERANCE. F = −10, +50%.

CAPACITANCE. EXPRESSED IN PICOFARADS. THE FIRST TWO DIGITS ARE SIGNIFICANT FIGURES, THE THIRD IS THE NUMBER OF ZEROS.

TYPE NUMBER. IDENTIFIES THE BASIC CAPACITOR DESIGN.

DIMENSIONS IN MILLIMETERS

Case Code	Bare Case		With Outer Insulation		Typical Weight
	Diameter ±0.40	Length* ±0.79	Diameter ±0.79	Length* Max.	Grams
KD	7.14	23.81	7.54	25.40	1.9
DD	9.53	23.81	9.92	25.40	3.4
DE	9.53	28.58	9.92	30.16	3.9
DG	9.53	34.93	9.92	36.51	4.6
DJ	9.53	41.28	9.92	42.86	5.3
DL	9.53	55.56	9.92	57.12	7.0
DX	9.53	68.26	9.92	69.82	8.4

*Style 4. For style 5 add 3.18mm.

DIMENSIONS IN INCHES

Case Code	Bare Case		With Outer Insulation		Typical Weight
	Diameter ±.015	Length* ±.031	Diameter ±.031	Length* Max.	Ounces
KD	0.281	0.937	0.296	1.000	.067
DD	0.375	0.937	0.391	1.000	.120
DE	0.375	1.125	0.391	1.187	.138
DG	0.375	1.375	0.391	1.437	.162
DJ	0.375	1.625	0.391	1.680	.187
DL	0.375	2.187	0.391	2.249	.247
DX	0.375	2.687	0.391	2.749	.296

*Style 4. For style 5 add 0.125".

STANDARD RATINGS

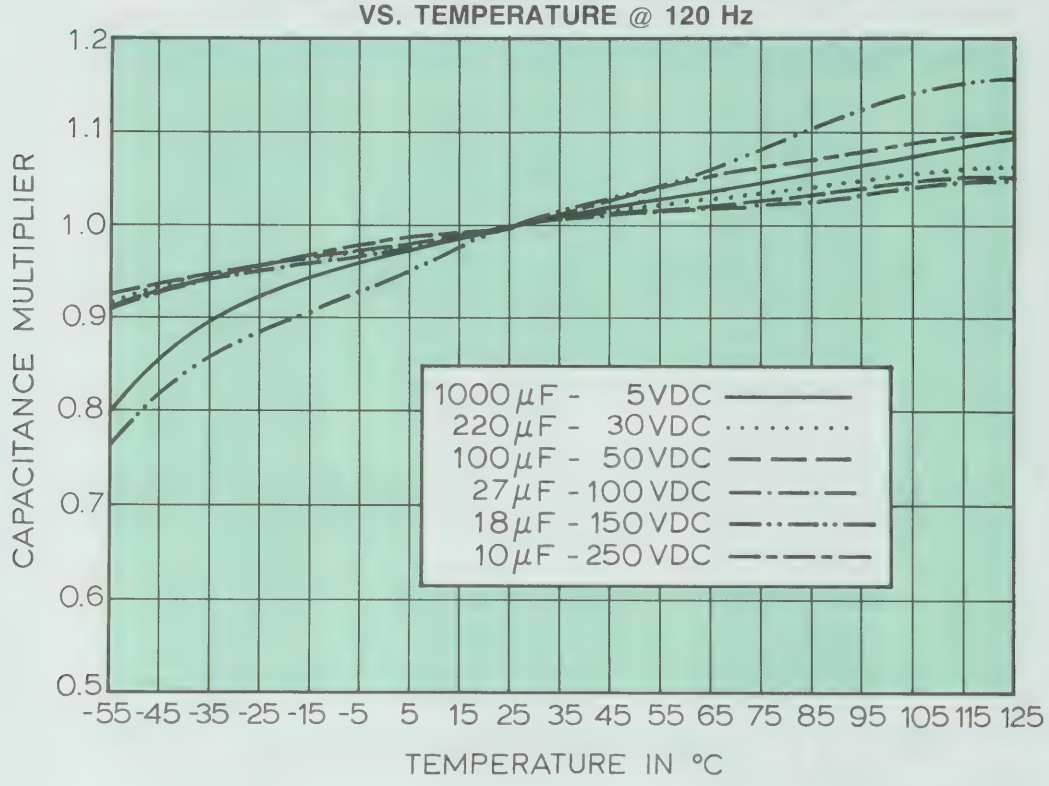
μF	Catalog Number	Nominal Case Size (mm) D x L	Max. ESR @ +25°C, 120Hz (Ω)	Max. Ripple Current @ +125°C, 120Hz (A)
5 VOLTS DC WORKING @ +85°C; 3 VOLTS DC WORKING @ +125°C				
220	600D227F005KD4	7.14 x 23.8	1.750	0.127
470	600D477F005DD4	9.53 x 23.8	0.813	0.221
680	600D687F005DE4	9.53 x 28.6	0.564	0.286
1000	600D108F005DG4	9.53 x 35.0	0.388	0.377
1200	600D128F005DJ4	9.53 x 41.3	0.320	0.477
1800	600D188F005DL4	9.53 x 55.5	0.210	0.631
2700	600D278F005DX4	9.53 x 68.2	0.140	0.851
7 VOLTS DC WORKING @ +85°C; 5 VOLTS DC WORKING @ +125°C				
180	600D187F007KD4	7.14 x 23.8	2.121	0.115
390	600D397F007DD4	9.53 x 23.8	0.972	0.202
470	600D477F007DE4	9.53 x 28.6	0.813	0.238
680	600D687F007DG4	9.53 x 35.0	0.564	0.312
1000	600D108F007DJ4	9.53 x 41.3	0.388	0.406
1500	600D158F007DL4	9.53 x 55.5	0.260	0.567
2200	600D228F007DX4	9.35 x 68.2	0.175	0.761
10 VOLTS DC WORKING @ +85°C; 7 VOLTS DC WORKING @ +125°C				
120	600D127F010KD4	7.14 x 23.8	3.180	0.094
330	600D337F010DD4	9.53 x 23.8	1.160	0.185
390	600D397F010DE4	9.53 x 28.6	0.972	0.218
560	600D567F010DG4	9.53 x 35.0	0.673	0.286
820	600D827F010DJ4	9.53 x 41.3	0.460	0.373
1200	600D128F010DL4	9.53 x 55.5	0.318	0.513
1500	600D158F010DX4	9.53 x 68.2	0.230	0.664
15 VOLTS DC WORKING @ +85°C; 10 VOLTS DC WORKING @ +125°C				
100	600D107F015KD4	7.14 x 23.8	3.880	0.085
220	600D227F015DD4	9.53 x 23.8	1.750	0.150
330	600D337F015DE4	9.53 x 28.6	1.160	0.199
470	600D477F015DG4	9.53 x 35.0	0.813	0.260
560	600D567F015DJ4	9.53 x 41.3	0.686	0.305
820	600D827F015DL4	9.53 x 55.5	0.460	0.426
1200	600D128F015DX4	9.53 x 68.2	0.320	0.563
20 VOLTS DC WORKING @ +85°C; 15 VOLTS DC WORKING @ +125°C				
68	600D686F020KD4	7.14 x 23.8	4.274	0.081
150	600D157F020DD4	9.53 x 23.8	1.962	0.142
220	600D227F020DE4	9.53 x 28.6	1.325	0.186
330	600D337F020DG4	9.53 x 35.0	0.883	0.250
390	600D397F020DJ4	9.53 x 41.3	0.679	0.299
680	600D687F020DL4	9.53 x 55.5	0.564	0.385
820	600D827F020DX4	9.53 x 68.2	0.360	0.530
30 VOLTS DC WORKING @ +85°C; 20 VOLTS DC WORKING @ +125°C				
47	600D476F030KD4	7.14 x 23.8	3.060	0.096
100	600D107F030DD4	9.53 x 23.8	1.500	0.162
150	600D157F030DE4	9.53 x 28.6	1.000	0.215
220	600D227F030DG4	9.53 x 35.0	0.675	0.285
270	600D277F030DJ4	9.53 x 41.3	0.560	0.338
390	600D397F030DL4	9.53 x 55.5	0.375	0.472
560	600D567F030DX4	9.53 x 68.2	0.264	0.620
40 VOLTS DC WORKING @ +85°C; 30 VOLTS DC WORKING @ +125°C				
33	600D336F040KD4	7.14 x 23.8	4.500	0.079
82	600D826F040DD4	9.53 x 23.8	1.824	0.147
100	600D107F040DE4	9.53 x 28.6	1.500	0.175
150	600D157F040DG4	9.53 x 35.0	1.000	0.234
180	600D187F040DJ4	9.53 x 41.3	0.844	0.275
270	600D277F040DL4	9.53 x 55.5	0.540	0.394
390	600D397F040DX4	9.53 x 68.2	0.397	0.505

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size (mm) D x L	Max. ESR @ +25°C, 120Hz (Ω)	Max. Ripple Current @ +125°C, 120Hz (A)
50 VOLTS DC WORKING @ +85°C; 40 VOLTS DC WORKING @ +125°C				
22	600D226F050KD4	7.14 x 23.8	6.750	0.065
56	600D566F050DD4	9.53 x 23.8	2.650	0.122
68	600D686F050DE4	9.53 x 28.6	2.170	0.146
100	600D107F050DG4	9.53 x 35.0	1.500	0.192
150	600D157F050DJ4	9.53 x 41.3	1.000	0.253
180	600D187F050DL4	9.53 x 55.5	0.844	0.315
270	600D277F050DX4	9.53 x 68.2	0.540	0.433
60 VOLTS DC WORKING @ +85°C; 50 VOLTS DC WORKING @ +125°C				
15	600D156F060KD4	7.14 x 23.8	9.650	0.055
39	600D396F060DD4	9.53 x 23.8	3.850	0.102
47	600D476F060DE4	9.53 x 28.6	3.060	0.123
82	600D826F060DG4	9.53 x 35.0	1.820	0.174
100	600D107F060DJ4	9.53 x 41.3	1.500	0.207
150	600D157F060DL4	9.53 x 55.5	1.000	0.290
220	600D227F060DX4	9.53 x 68.2	0.675	0.388
75 VOLTS DC WORKING @ +85°C; 60 VOLTS DC WORKING @ +125°C				
12	600D126F075KD4	7.14 x 23.8	12.300	0.048
27	600D276F075DD4	9.53 x 23.8	5.625	0.084
39	600D396F075DE4	9.53 x 28.6	3.857	0.110
56	600D566F075DG4	9.53 x 35.0	2.640	0.144
82	600D826F075DJ4	9.53 x 41.3	1.820	0.187
120	600D127F075DL4	9.53 x 55.5	1.227	0.261
150	600D157F075DX4	9.53 x 68.2	1.000	0.399
100 VOLTS DC WORKING @ +85°C; 75 VOLTS DC WORKING @ +125°C				
6.8	600D685F100KD4	7.14 x 23.8	22.500	0.036
22	600D226F100DD4	9.53 x 23.8	6.750	0.077
27	600D276F100DE4	9.53 x 28.6	5.625	0.091
39	600D396F100DG4	9.53 x 43.0	3.857	0.120
56	600D566F100DJ4	9.53 x 55.3	2.640	0.156
82	600D826F100DL4	9.53 x 68.5	1.824	0.215
120	600D127F100DX4	9.53 x 68.2	1.270	0.291
150 VOLTS DC WORKING @ +85°C; 100 VOLTS DC WORKING @ +125°C				
3.3	600D335F150KD4	7.14 x 23.8	38.300	0.028
6.8	600D685F150DD4	9.53 x 23.8	19.160	0.046
12	600D126F150DE4	9.53 x 28.6	10.500	0.066
18	600D186F150DG4	9.53 x 35.0	6.850	0.090
22	600D226F150DJ4	9.53 x 41.3	5.750	0.106
33	600D336F150DL4	9.53 x 55.5	3.830	0.148
47	600D476F150DX4	9.53 x 68.2	2.610	0.197
200 VOLTS DC WORKING @ +85°C; 150 VOLTS DC WORKING @ +125°C				
3.3	600D335F200KD4	7.14 x 23.8	38.300	0.028
6.8	600D685F200DD4	9.53 x 23.8	19.160	0.046
8.2	600D825F200DE4	9.53 x 28.6	15.500	0.055
12	600D126F200DG4	9.53 x 35.0	10.500	0.073
18	600D186F200DJ4	9.53 x 41.3	6.780	0.098
27	600D276F200DL4	9.53 x 55.5	4.790	0.132
33	600D336F200DX4	9.53 x 68.2	3.830	0.162
250 VOLTS DC WORKING @ +85°C; 200 VOLTS DC WORKING @ +125°C				
2.2	600D225F250KD4	7.14 x 23.8	57.500	0.023
5.6	600D565F250DD4	9.53 x 23.8	23.100	0.042
6.8	600D685F250DE4	9.53 x 28.6	19.160	0.050
10	600D106F250DG4	9.53 x 35.0	12.700	0.066
15	600D156F250DJ4	9.53 x 41.3	8.230	0.088
22	600D226F250DL4	9.53 x 55.5	5.750	0.121
27	600D276F250DX4	9.53 x 68.2	4.790	0.146

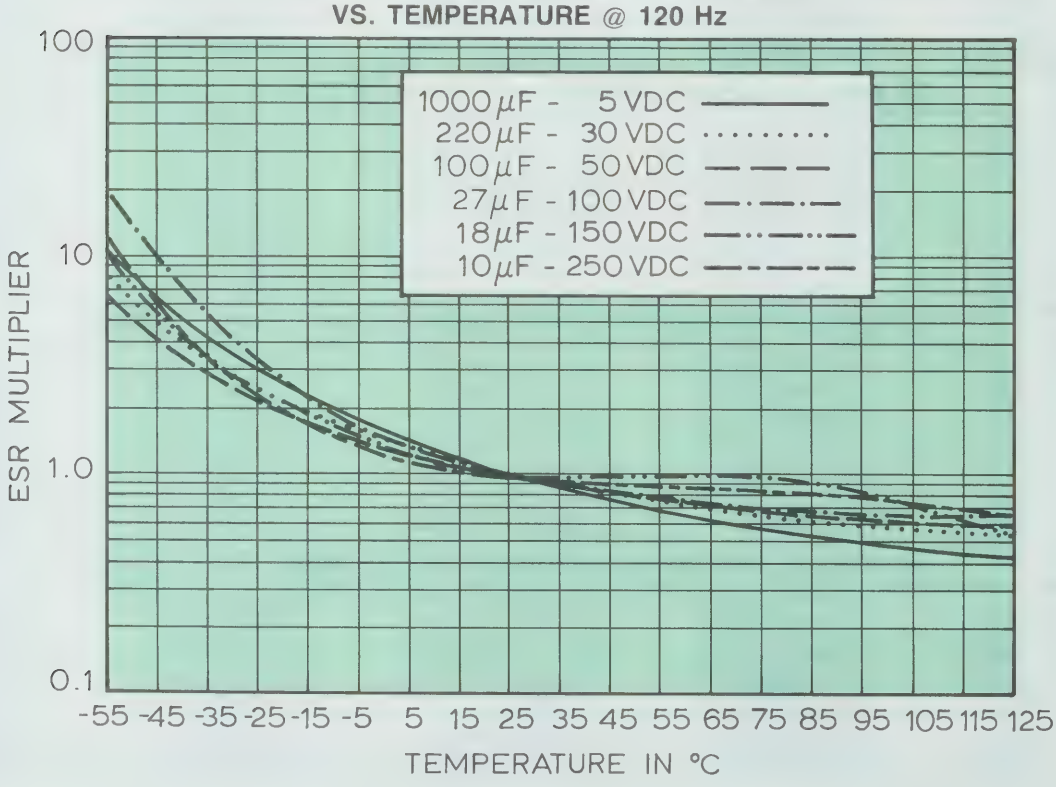
TYPICAL CURVES

TYPE 600D — TYPICAL CAPACITANCE MULTIPLIER VS. TEMPERATURE @ 120 Hz



Dwg. No. A-14,786

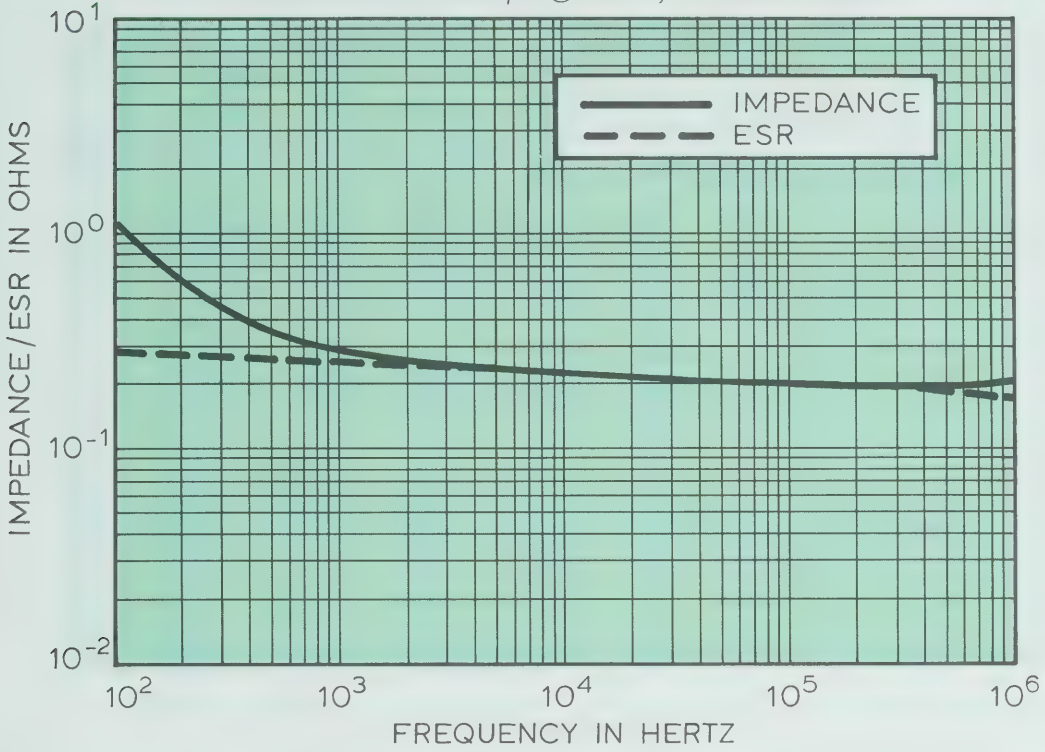
TYPE 600D — TYPICAL ESR MULTIPLIER VS. TEMPERATURE @ 120 Hz



Dwg. No. A-14,773

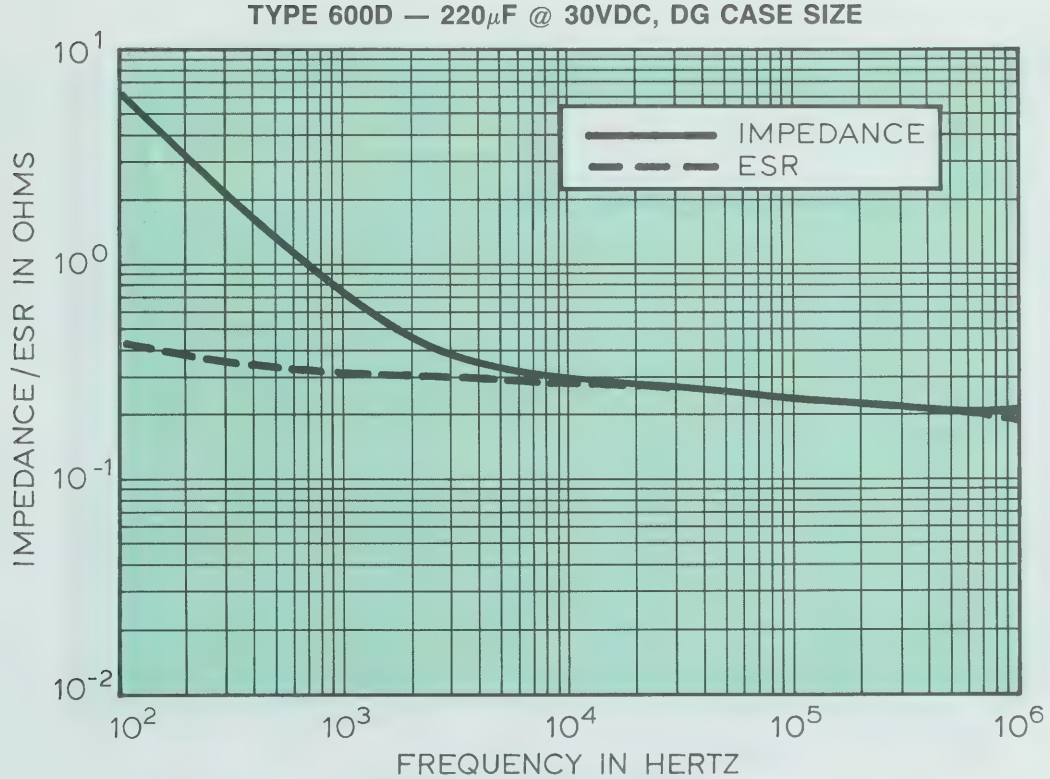
TYPICAL CURVES @ +25°C

TYPE 600D — 1000μF @ 5VDC, DG CASE SIZE



Dwg. No. A-14,766

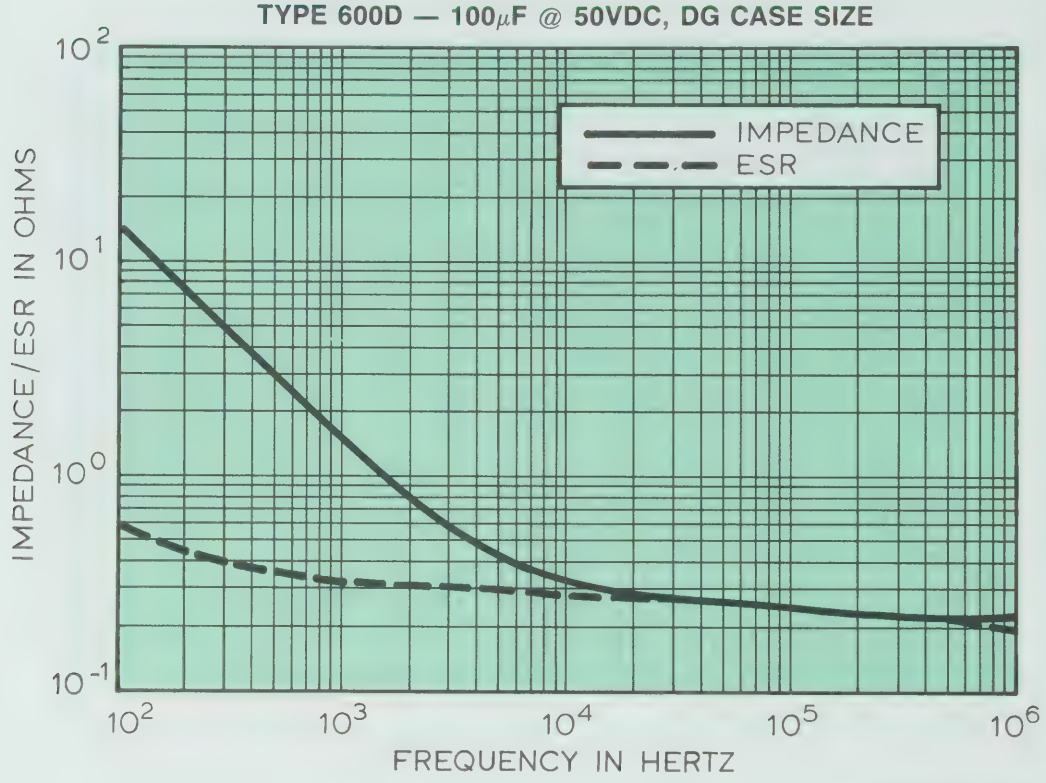
TYPE 600D — 220μF @ 30VDC, DG CASE SIZE



Dwg. No. A-14,767

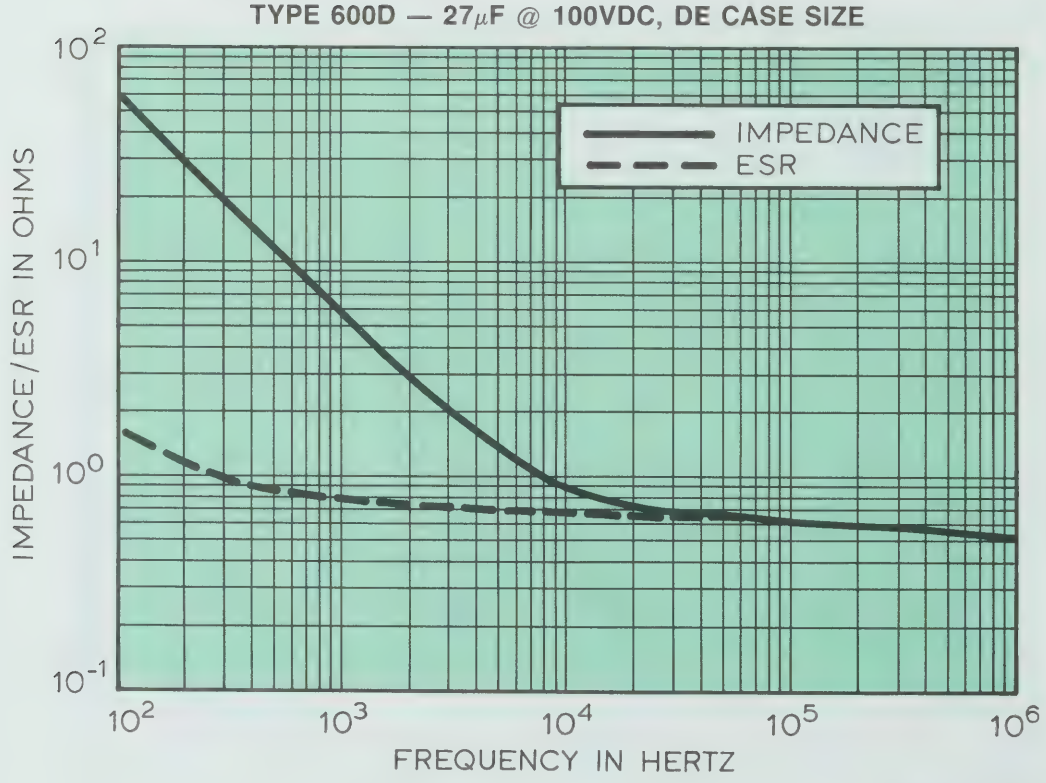
TYPICAL CURVES @ +25°C

TYPE 600D — 100μF @ 50VDC, DG CASE SIZE



Dwg. No. A-14,765

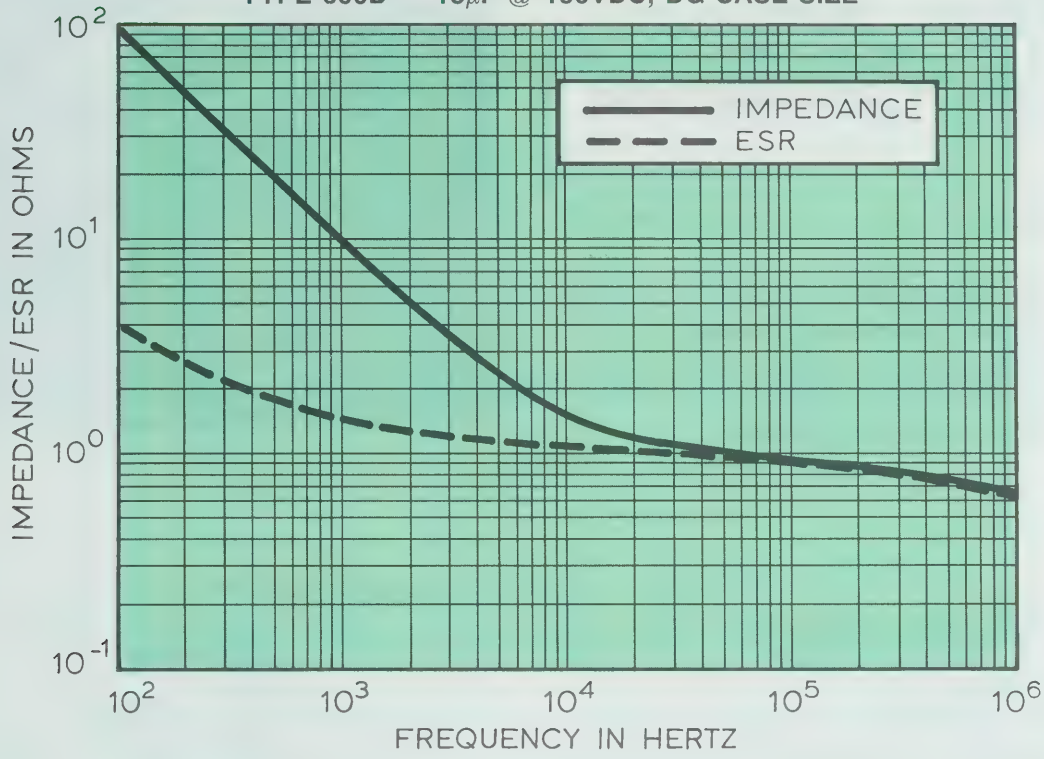
TYPE 600D — 27μF @ 100VDC, DE CASE SIZE



Dwg. No. A-14,764

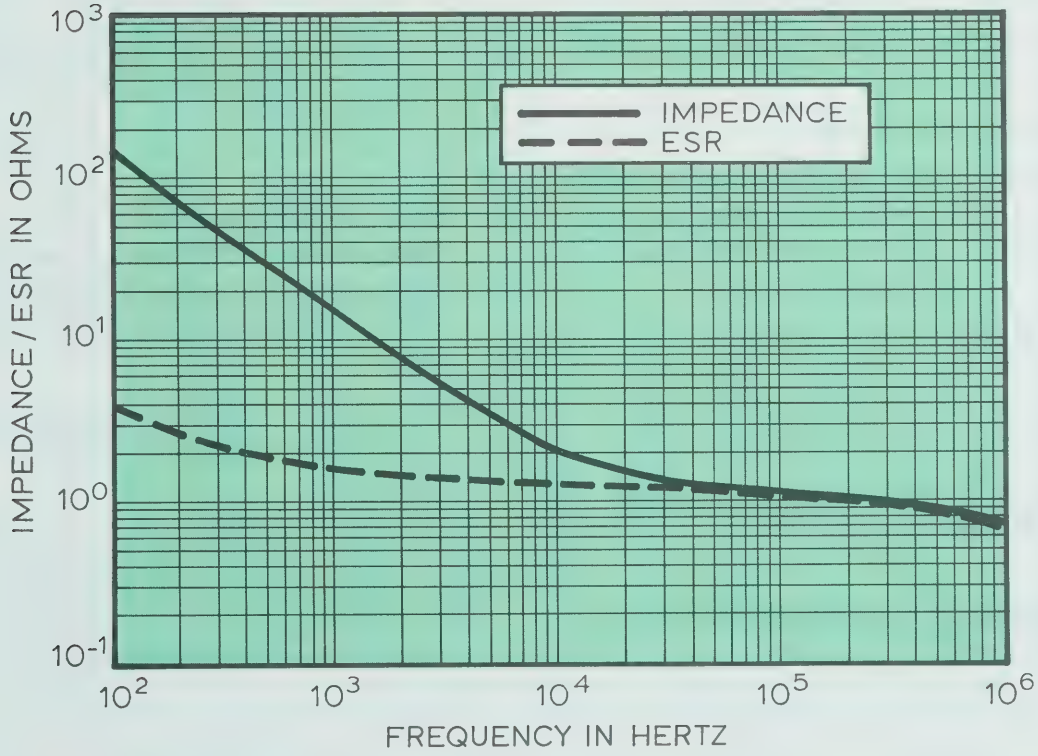
TYPICAL CURVES @ +25°C

TYPE 600D — 18μF @ 150VDC, DG CASE SIZE



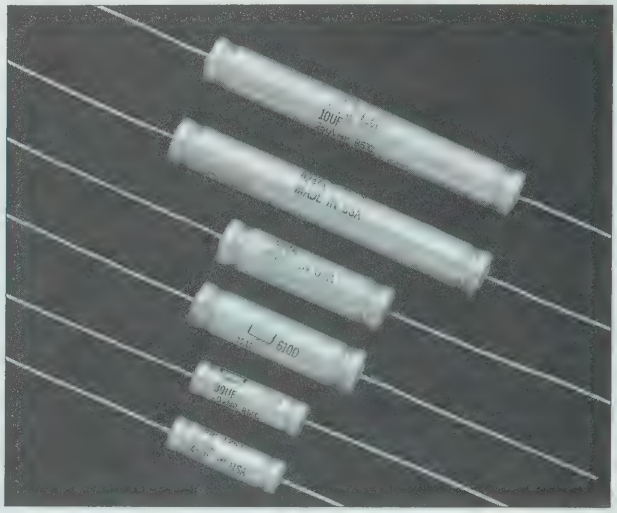
Dwg. No. A-14,763

TYPE 600D — 10μF @ 250VDC, DG CASE SIZE



Dwg. No. A-14,768

+125°C Non-Polar, Miniature Aluminum Capacitors



L65-05

Features —

- Extended Temperature Range
- Exceptional Capacitance Stability
- Low DC Leakage Current
- Tantalum Foil Replacement
- Mil Version — MIL-C-39018/02

General Specifications —

Operating Temperature: −55°C to +125°C.

Voltage Range: 7 - 250 VDC.

Capacitance Range: 0.68μF - 680μF.

Capacitance Tolerance: −10%, +50%.

Case Size Range: 0.296″ x 1.000″ - 0.390″ x 2.812″

Termination: Axial Leads.

Life Validation Test: 2000 hours @ +125°C:
Δ CAP ±15% from initial measurement.
Δ ESR < 1.3x initial specified limit.
Δ DCL < initial specified limit.

Shelf Test: 500 hrs @ +125°C:
C < 10% from initial measurement.
Δ ESR < 1.2x initial specified limit.
Δ DCL < 2.0x initial specified limit.

DC Leakage Current: 5 min. charge time. See Standard Ratings table.

Performance Characteristics —

SEE PAGE 2.

Ripple Current Multipliers:

TEMPERATURE

Ambient Temp.	Multipliers
+125°C	1.0
+105°C	2.24
+95°C	2.65
+85°C	3.0
+65°C	3.61

FREQUENCY Hz

VDC	50-60	100-120	300-400	>100K
6-60	0.85	1.0	1.10	1.15
61-250	0.83	1.0	1.15	1.20

Low Temperature Performance:
Capacitance. The maximum allowable capacitance change with temperature from +25°C shall be in accordance with the following table:

Rated Voltage at 125°C	Per Cent Capacitance Change at −55°C	+85°C	+125°C
5 thru 15	−30	+15	+20
20 and up	−25	+15	+20

Impedance. When measured at a temperature of −55°C and a frequency of 120 Hz, the impedance shall not exceed the values listed in the Standard Ratings Table.

Catalog Numbering System

610D 476 G 007 KD 2

STYLE NUMBER. 2 = OUTER INSULATION
5 = OUTER INSULATION WITH POLYMER COATED END-SEALS

CASE CODE. SEE TABLE OF DIMENSIONS.

DC VOLTAGE RATING TO 85°C. EXPRESSED IN VOLTS. ZEROS ARE USED TO PRECEDE THE VOLTAGE RATING.

CAPACITANCE TOLERANCE. F = −10, +50%
G = −10, +75%

CAPACITANCE. EXPRESSED IN PICOFARADS. THE FIRST TWO DIGITS ARE SIGNIFICANT FIGURES, THE THIRD IS THE NUMBER OF ZEROS.

TYPE NUMBER. IDENTIFIES THE BASIC CAPACITOR DESIGN.

DIMENSIONS IN INCHES

	With Outer Insulation		
Case Code	Diam. (±0.031)	Length* (Max.)	Typical Weight (Ounces)
KD	0.296	1.000	.067
DE	0.390	1.187	.138
DU	0.390	1.500	.173
DL	0.390	2.187	.247
DR	0.390	2.812	.303

*Style 2. For Style 5 increase the maximum length by 0.125″.

DIMENSIONS IN MILLIMETERS

	With Outer Insulation		
Case Code	Diam. (±0.79)	Length* (Max.)	Typical Weight (Grams)
KD	7.54	25.40	1.9
DE	9.92	30.16	3.9
DU	9.92	38.10	4.9
DL	9.92	55.56	7.0
DR	9.92	71.42	8.6

*Style 2. For Style 5 increase the maximum length by 3.18 mm.

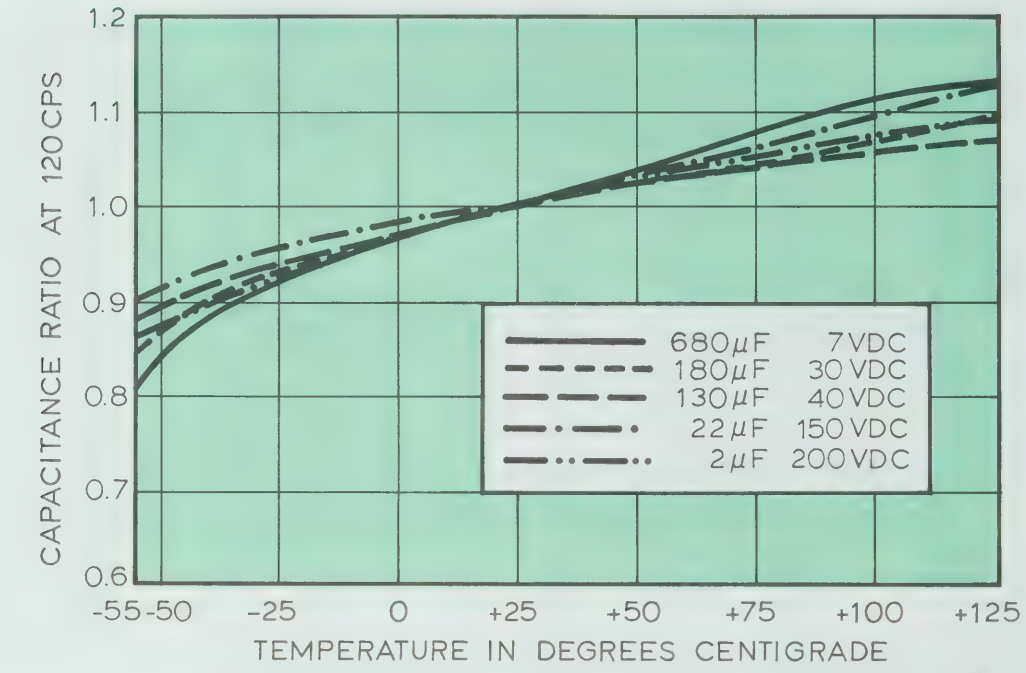
STANDARD RATINGS

μF	Catalog Number*	Case Size (mm) D x L	Max. Impedance @ −55°C, 120Hz	Max. DC Leakage Current (μA) @ +25°C	@ +85°C & +125°C	Max. ESR @ +25°C 120Hz (Ω)	Max. Ripple Current @ +125°C 120HZ (mA)
7 VOLTS DC WORKING @ +85°C; 5 VOLTS DC WORKING @ +125°C							
47	610D476G007KD2	7.54 x 25.4	64	4	12	5.8	100
90	610D906G007DE2	9.92 x 30.16	33	7	21	3.0	180
220	610D227G007DU2	9.92 x 38.1	14	10	30	1.2	300
470	610D477G007DL2	9.92 x 55.56	6.4	16	48	0.58	500
680	610D687G007DR2	9.92 x 71.44	4.4	24	72	0.40	700
10 VOLTS DC WORKING @ +85°C; 7 VOLTS DC WORKING @ +125°C							
39	610D396G010KD2	7.54 x 25.4	77	4	12	7.1	90
70	610D706G010DE2	9.92 x 30.16	43	7	21	3.9	160
180	610D187G010DU2	9.92 x 38.1	17	10	30	1.5	270
330	610D337G010DL2	9.92 x 55.56	9.1	16	48	0.82	440
470	610D477G010DR2	9.92 x 71.44	6.4	24	72	0.58	600
15 VOLTS DC WORKING @ +85°C; 10 VOLTS DC WORKING @ +125°C							
33	610D336G015KD2	7.54 x 25.4	91	4	12	8.3	80
55	610D556G015DE2	9.92 x 30.16	55	7	21	5.0	140
120	610D127G015DU2	9.92 x 38.1	25	9	27	2.3	220
150	610D157G015DU2	9.92 x 38.1	20	10	30	1.8	250
270	610D277G015DL2	9.92 x 55.56	11	16	48	1.0	400
390	610D397G015DR2	9.92 x 71.44	7.7	24	72	0.70	550
20 VOLTS DC WORKING @ +85°C; 15 VOLTS DC WORKING @ +125°C							
22	610D226G020KD2	7.54 x 25.4	136	5	15	12	65
40	610D406G020DE2	9.92 x 30.16	75	7	21	6.9	120
100	610D107G020DU2	9.92 x 38.1	30	10	30	2.8	260
200	610D207G020DL2	9.92 x 55.56	15	16	48	1.42	340
300	610D307G020DR2	9.92 x 71.44	10	24	72	0.92	480
30 VOLTS DC WORKING @ +85°C; 20 VOLTS DC WORKING @ +125°C							
15	610D156G030KD2	7.54 x 25.4	130	5	15	13	65
27	610D276G030DE2	9.92 x 30.16	75	7	21	7.4	120
56	610D566G030DU2	9.92 x 38.1	36	9	27	3.6	180
68	610D686G030DU2	9.92 x 38.1	30	10	30	2.9	190
120	610D127G030DL2	9.92 x 55.56	17	15	45	1.7	310
150	610D157G030DL2	9.92 x 55.56	13	16	48	1.3	340
180	610D187G030DR2	9.92 x 71.44	11	24	72	1.1	440
40 VOLTS DC WORKING @ +85°C; 30 VOLTS DC WORKING @ +125°C							
9	610D905G040KD2	7.54 x 25.4	220	6	18	22	50
17	610D176G040DE2	9.92 x 30.16	120	8	24	12	90
40	610D406G040DU2	9.92 x 38.1	50	10	30	5.0	150
85	610D856G040DL2	9.92 x 55.56	24	16	48	2.4	260
130	610D137G040DR2	9.92 x 71.44	15	24	72	1.5	370
50 VOLTS DC WORKING @ +85°C; 40 VOLTS DC WORKING @ +125°C							
6.8	610D685G050KD2	7.54 x 25.4	300	6	18	29	40
12	610D126G050DE2	9.92 x 30.16	170	8	24	17	80
27	610D276G050DU2	9.92 x 38.1	74	10	30	7.4	120
56	610D566G050DL2	9.92 x 55.56	36	16	48	3.6	210
82	610D826G050DR2	9.92 x 71.44	23	24	72	2.4	290
60 VOLTS DC WORKING @ +85°C; 50 VOLTS DC WORKING @ +125°C							
5.0	610D505G060KD2	7.54 x 25.4	400	7	21	40	35
9.0	610D905G060DE2	9.92 x 30.16	220	9	27	22	65
24	610D246G060DU2	9.92 x 38.1	83	11	33	8.3	110
47	610D476G060DL2	9.92 x 55.56	43	16	48	4.3	200
70	610D706G060DR2	9.92 x 71.44	29	24	72	2.9	270

STANDARD RATINGS

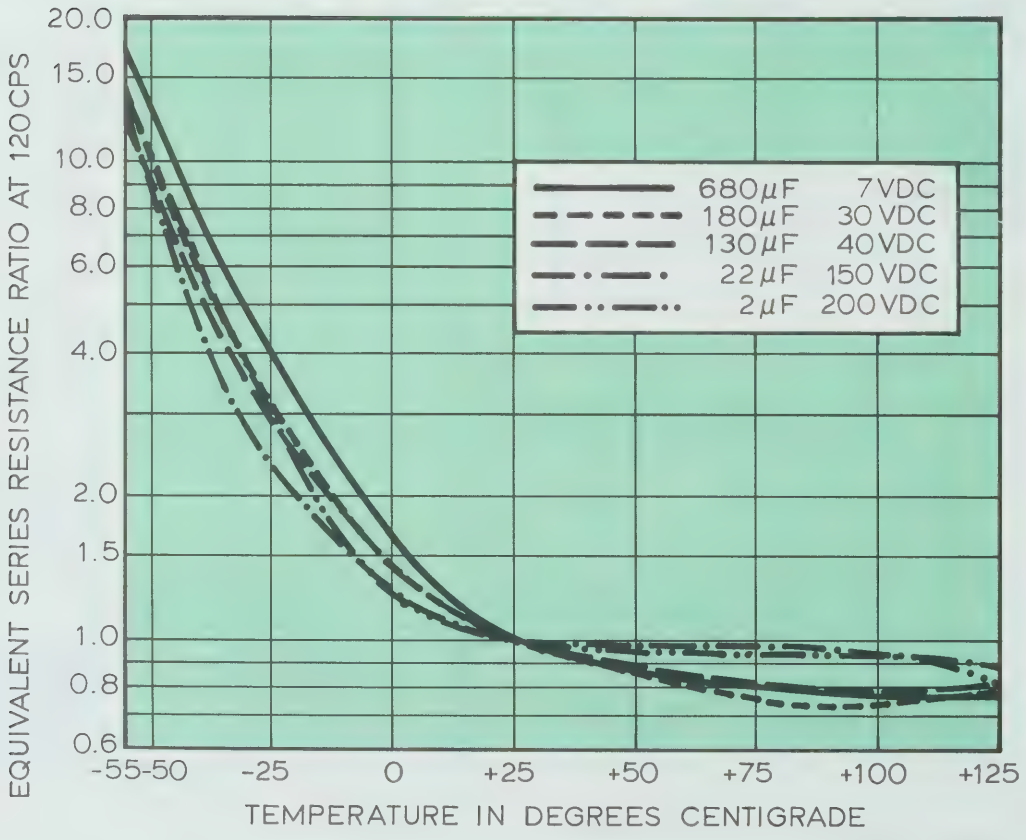
μF	Catalog Number*	Case Size (mm) D x L	Max. Impedance @ −55°C, 120Hz	Max. DC Leakage Current (μA) @ +25°C	Max. DC Leakage Current (μA) @ +85°C & +125°C	Max. ESR @ +25°C 120Hz (Ω)	Max. Ripple Current @ +125°C 120Hz (mA)
75 VOLTS DC WORKING @ +85°C; 60 VOLTS DC WORKING @ +125°C							
3.9	610D395F075KD2	7.54 x 25.4	510	7	21	51	30
8.0	610D805F075DE2	9.92 x 30.16	250	9	27	25	60
15	610D156F075DU2	9.92 x 38.1	130	10	30	13.3	90
18	610D186F075DU2	9.92 x 38.1	110	11	33	11	100
39	610D396F075DL2	9.92 x 55.56	51	16	48	5.1	170
56	610D566F075DR2	9.92 x 71.44	36	24	72	3.6	240
100 VOLTS DC WORKING @ +85°C; 75 VOLTS DC WORKING @ +125°C							
2.2	610D225F100KD2	7.54 x 25.4	910	8	12	91	25
4.0	610D405F100DE2	9.92 x 30.16	500	12	36	50	45
12	610D126F100DU2	9.92 x 38.1	170	16	48	17	80
22	610D226F100DL2	9.92 x 55.56	91	18	54	9.1	130
33	610D336F100DR2	9.92 x 71.44	61	28	84	6.0	180
150 VOLTS DC WORKING @ +85°C; 100 VOLTS DC WORKING @ +125°C							
1.8	610D185F150KD2	7.54 x 25.4	1100	10	30	110	20
3.0	610D305F150DE2	9.92 x 30.16	670	12	36	67	40
5.6	610D565F150DU2	9.92 x 38.1	360	14	42	36	55
8.2	610D825F150DU2	9.92 x 38.1	230	16	48	24	70
12	610D126F150DL2	9.92 x 55.56	170	18	54	17	100
15	610D156F150DL2	9.92 x 55.56	130	20	60	13	110
22	610D226F150DR2	9.92 x 71.44	91	28	84	9.1	150
200 VOLTS DC WORKING @ +85°C; 150 VOLTS DC WORKING @ +125°C							
1.0	610D105F200KD2	7.54 x 25.4	2000	12	36	200	15
2.0	610D205F200DE2	9.92 x 30.16	1000	16	48	100	30
5.0	610D505F200DU2	9.92 x 38.1	400	20	60	40	50
10	610D106F200DL2	9.92 x 55.56	200	24	72	20	90
15	610D156F200DR2	9.92 x 71.44	130	32	96	13	120
250 VOLTS DC WORKING @ +85°C; 200 VOLTS DC WORKING @ +125°C							
0.68	610D684F250KD2	7.54 x 25.4	3000	14	42	290	15
1.0	610D105F250DE2	9.92 x 30.16	2000	18	54	200	20
3.3	610D335F250DU2	9.92 x 38.1	610	22	66	60	40
6.8	610D685F250DL2	9.92 x 55.56	300	26	78	29	70
10	610D106F250DR2	9.92 x 71.44	200	36	108	20	100

TYPICAL CURVES OF CAPACITANCE VS. TEMPERATURE



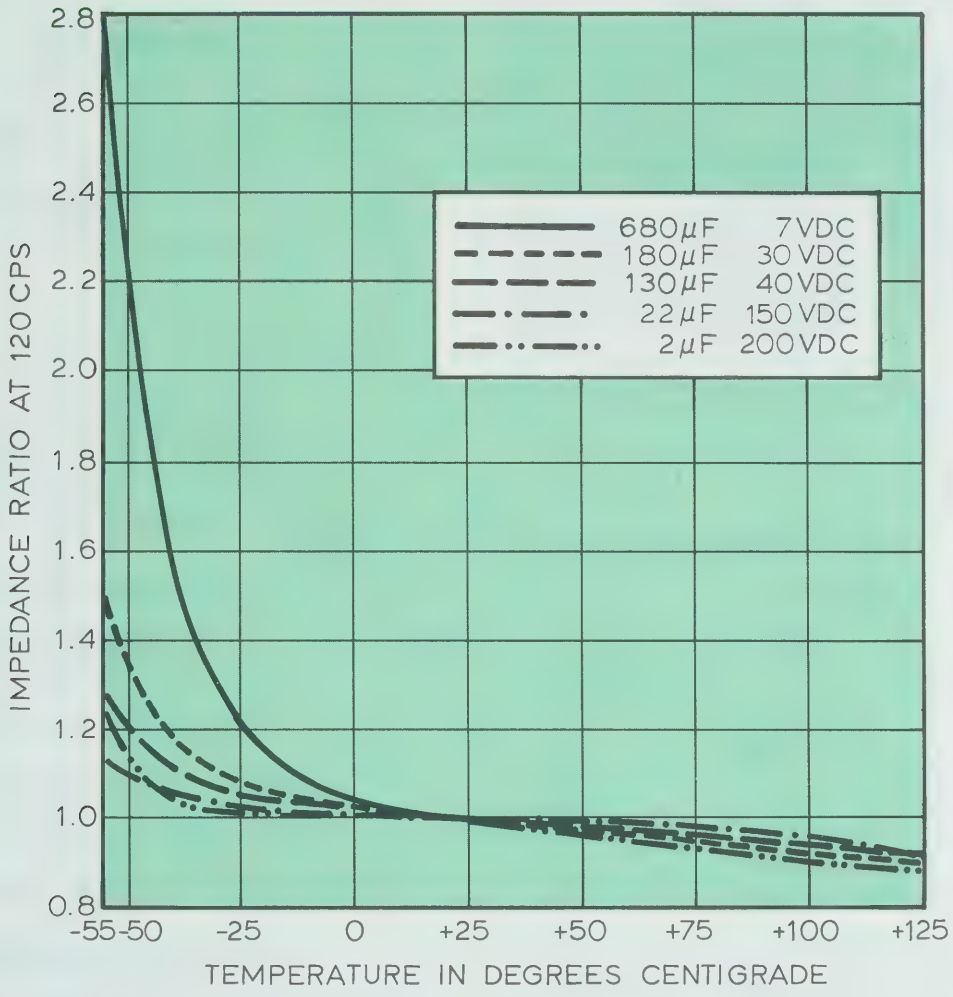
Dwg. No. A-14,882

TYPICAL CURVES OF EQUIVALENT SERIES RESISTANCE VS. TEMPERATURE



Dwg. No. A-14,883

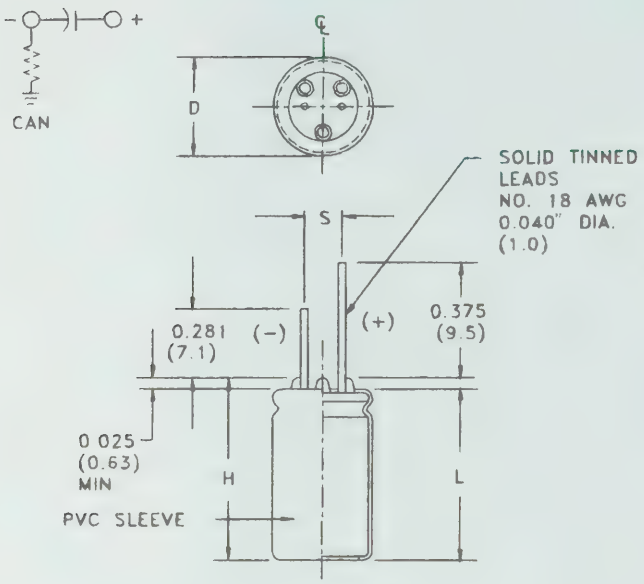
TYPICAL CURVES OF IMPEDANCE VS. TEMPERATURE



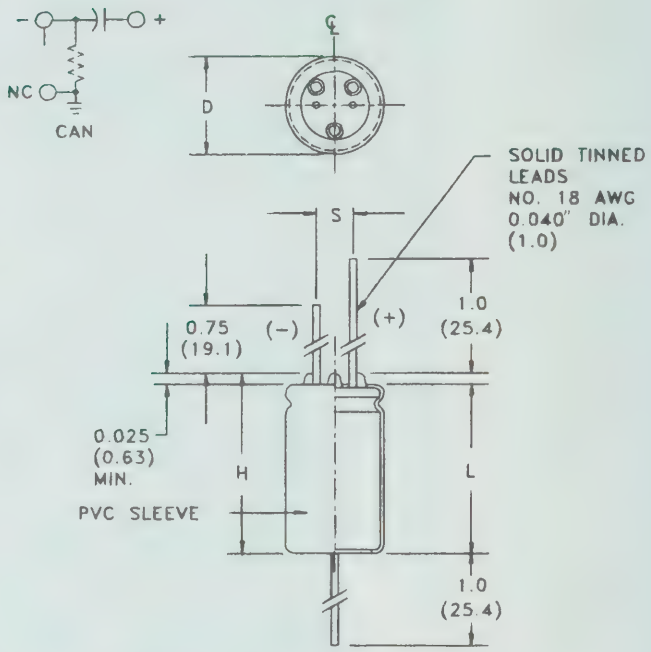
Dwg. No. A-14,884

OUTLINE DRAWINGS FOR TYPES 673D/674D, 676D/677D,767D

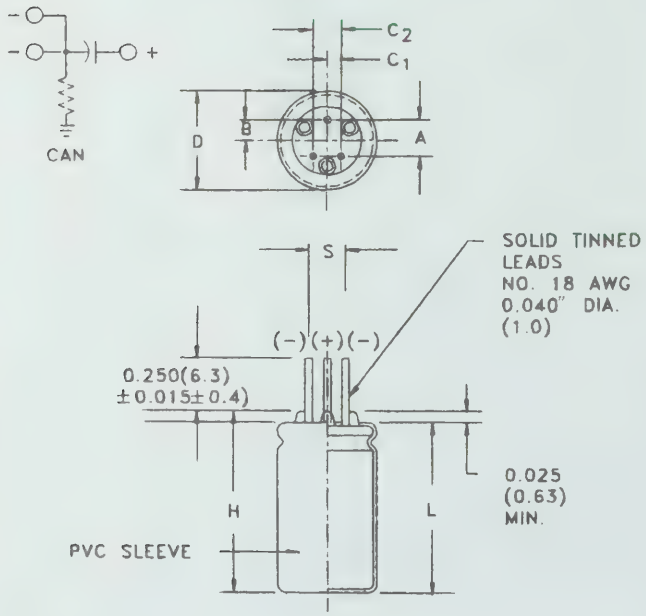
LEAD CODE C INCHES (MM)



LEAD CODE J INCHES (MM)



LEAD CODE A INCHES (MM)



LEAD SPACING – INCHES

Case Diameter	A ±0.015	B ±0.015	C1 ±0.015	C2 ±0.015	S ±0.015
0.750	0.300	0.1665	0.100	0.200	0.250
0.875	0.400	0.228	0.150	0.300	0.300
1.000	0.400	0.228	0.150	0.300	0.400

LEAD SPACING – MM

Case Diameter	A ±0.381	B ±0.381	C1 ±0.381	C2 ±0.381	S ±0.381
19.1	7.6	4.2	2.5	5.1	6.4
22.2	10.2	5.8	3.8	7.6	7.6
25.4	10.2	5.8	3.8	7.6	10.2

+105°C Tubular Radial Lead Aluminum Capacitors

L65-04

Features —

- Wide Temperature Range
- Radial Design in 2 & 3 Lead Configuration
- Ideal SMPS Output Filter

General Specifications —

Operating Temperature: −55°C to +105°C.

Voltage Range: 6.3 - 250 VDC.

Capacitance Range: 27μF - 27,000μF.

Capacitance Tolerance: −10%, +50%.

Case Size Range: 0.75″ x 1.125″ - 1.0″ x 3.625″.

Termination: Radial leads.
Optional 3rd lead for axial style.

Life Validation Test: 2000 hrs @ +105°C:
Δ CAP ≤ 15% from initial measurement.
Δ ESR ≤ 1.5x initial specified limit.
Δ DCL ≤ initial specified limit.

Shelf Test: 500 hrs @ +105°C:
Δ CAP ≤ 10% from initial measurement.
Δ ESR ≤ 1.15x initial specified limit.
Δ DCL ≤ 2x initial specified limit.

DC Leakage Current: after 5 min. charge.
$I = K\sqrt{CV}$
K = 0.5 @ +25°C
I in μa, C in μF, V in Volts

Ripple Current Multipliers:

TEMPERATURE

Ambient Temp.	+105°C	+85°C	+65°C	+45°C	+25°C
Multipliers	0.45	1.0	1.3	1.6	1.8

FREQUENCY Hz

Rated WVDC	50-60	100-120	300-400	1000	20,000
0-60	0.60	0.75	0.80	0.90	1.0
61-250	0.43	0.54	0.75	0.85	1.0

Low Temperature Performance:

Capacitance Ratio $C^{-55°C}/C^{+25°C}$ min. @ 120Hz

Rated Voltage (VDC)	Capacitance Remaining
6.3-25	75%
40-100	80%
150-250	65%

ESR Ratio $ESR^{-55°C}/ESR^{+25°C}$ max. @ 120Hz

Rated Voltage (VDC)	Multipliers
0-12	8
13-40	10
41-100	16
160-250	100

Performance Characteristics —

SEE PAGE 2.

Catalog Numbering System

673D 228 F 6R3 GE 1 C

LEAD CODE. C = 2 LEAD RADIAL MOUNT (673D).
J = 3 LEAD AXIAL MOUNT (Optional on 673D).
A = KEYED POLARITY 3-LEAD RADIAL MOUNT (674D).

CASE STYLE. 1 = PVC INSULATING SLEEVE (Standard for +105°C Operation).
7 = PVC SLEEVE WITH RESIN END SEAL. (Optional).
(Required for exposure to halogenated cleaning solvents).

CASE CODE. SEE DIMENSIONS.

DC VOLTAGE RATING. EXPRESSED IN VOLTS. THE LETTER 'R' IS USED AS THE DECIMAL POINT, FOR EXAMPLE, 6R3 = 6.3 VOLTS.

CAPACITANCE TOLERANCE. F = −10, +50%.

CAPACITANCE. EXPRESSED IN PICOFARADS. THE FIRST TWO DIGITS ARE SIGNIFICANT FIGURES, THE THIRD IS THE NUMBER OF ZEROS.

TYPE NUMBER. IDENTIFIES THE BASIC CAPACITOR DESIGN.
673D = LEAD CODES C AND J ONLY.
674D = LEAD CODE A ONLY.

DIMENSIONS IN INCHES

CASE CODE	STYLE 1 STYLE 7 D ±0.015	STYLE 1 STYLE 7 L ±0.062	OVERALL LENGTH H MAX.	LEAD SPACING* S ±0.015	TYPICAL WEIGHT (oz)
GE	0.770	1.150	1.246	0.250	0.46
GJ	0.770	1.650	1.746	0.250	0.64
GL	0.770	2.150	2.246	0.250	0.81
GP	0.770	2.650	2.746	0.250	0.99
GS	0.770	3.150	3.246	0.250	1.16
GT	0.770	3.650	3.746	0.250	1.34
HE	0.895	1.150	1.246	0.300	0.63
HJ	0.895	1.650	1.746	0.300	0.88
HL	0.895	2.150	2.246	0.300	1.09
HP	0.895	2.650	2.746	0.300	1.34
HS	0.895	3.150	3.246	0.300	1.59
HT	0.895	3.650	3.746	0.300	1.83
JE	1.020	1.150	1.246	0.400	0.81
JJ	1.020	1.650	1.746	0.400	1.13
JL	1.020	2.150	2.246	0.400	1.45
JP	1.020	2.650	2.746	0.400	1.76
JS	1.020	3.150	3.246	0.400	2.08
JT	1.020	3.650	3.746	0.400	2.40

*Type 673D Only.

DIMENSIONS IN MILLIMETERS

(Based on 1″ = 25.4 mm)

CASE CODE	STYLE 1 STYLE 7 D ±0.4	STYLE 1 STYLE 7 L ±1.6	OVERALL LENGTH H MAX.	LEAD SPACING* S ±0.4	TYPICAL WEIGHT (grams)
GE	19.6	29.2	31.6	6.4	13
GJ	19.6	41.9	44.3	6.4	18
GL	19.6	54.6	57.0	6.4	23
GP	19.6	67.3	69.7	6.4	28
GS	19.6	80.0	82.4	6.4	33
GT	19.6	92.7	95.1	6.4	38
HE	22.7	29.2	31.6	7.6	18
HJ	22.7	41.9	44.3	7.6	25
HL	22.7	54.6	57.0	7.6	31
HP	22.7	67.3	69.7	7.6	38
HS	22.7	80.0	82.4	7.6	45
HT	22.7	92.7	95.1	7.6	52
JE	25.9	29.2	31.6	10.2	23
JJ	25.9	41.9	44.3	10.2	32
JL	25.9	54.6	57.0	10.2	41
JP	25.9	67.3	69.7	10.2	50
JS	25.9	80.0	82.4	10.2	59
JT	25.9	92.7	95.1	10.2	68

*Type 673D Only.

STANDARD RATINGS

μF	Catalog Number	Size (in) D x L	Max. ESR @ +25°C (mΩ) 120 Hz	Max. ESR @ +25°C (mΩ) 20k-40kHz	Max Ripple Current @ +85°C (A) 20k-40kHz	Max. Impedance @ 100 kHz (mΩ)
6.3 VOLTS DC WORKING; 9 VOLTS DC SURGE						
2200	673D228F6R3GE1C	0.770 x 1.150	105.0	81.0	2.30	83.0
4700	673D478F6R3GJ1C	0.770 x 1.650	53.0	41.0	3.70	43.0
6800	673D688F6R3GL1C	0.770 x 2.150	36.0	28.0	4.95	30.0
8200	673D828F6R3GP1C	0.770 x 2.650	28.0	22.7	6.11	25.0
10000	673D109F6R3GS1C	0.770 x 3.150	23.0	19.0	7.20	21.0
12000	673D129F6R3GT1C	0.770 x 3.650	21.0	17.0	8.14	19.0
3300	673D338F6R3HE1C	0.895 x 1.150	74.0	58.0	3.00	60.0
6800	673D688F6R3HJ1C	0.895 x 1.650	38.0	39.0	4.73	41.0
10000	673D109F6R3HL1C	0.895 x 2.150	27.0	22.0	6.20	24.0
15000	673D159F6R3HP1C	0.895 x 2.650	21.0	17.4	7.62	19.0
18000	673D189F6R3HS1C	0.895 x 3.150	18.0	15.0	8.83	17.0
22000	673D229F6R3HT1C	0.895 x 3.650	15.8	13.3	10.10	15.0
4700	673D478F6R3JE1C	1.020 x 1.150	60.0	48.0	3.60	50.0
10000	673D109F6R3JJ1C	1.020 x 1.650	32.0	26.0	5.54	28.0
15000	673D159F6R3JL1C	1.020 x 2.150	22.6	18.8	7.30	21.0
18000	673D189F6R3JP1C	1.020 x 2.650	18.0	15.2	8.81	17.0
22000	673D229F6R3JS1C	1.020 x 3.150	15.4	13.0	10.20	14.0
27000	673D279F6R3JT1C	1.020 x 3.650	13.4	11.5	11.60	13.0
10 VOLTS DC WORKING; 12 VOLTS DC SURGE						
1800	673D188F010GE1C	0.770 x 1.150	123.0	89.0	2.20	91.0
3300	673D338F010GJ1C	0.770 x 1.650	60.0	44.0	3.56	46.0
5600	673D568F010GL1C	0.770 x 2.150	41.0	30.0	4.79	32.0
6800	673D688F010GP1C	0.770 x 2.650	31.0	24.0	5.93	26.0
8200	673D828F010GS1C	0.770 x 3.150	26.0	20.0	7.02	22.0
10000	673D109F010GT1C	0.770 x 3.650	23.0	17.8	7.97	20.0
2700	673D278F010HE1C	0.895 x 1.150	82.0	61.0	2.90	62.0
5600	673D568F010HJ1C	0.895 x 1.650	42.0	32.0	4.61	34.0
8200	673D828F010HL1C	0.895 x 2.150	29.6	22.0	6.11	24.0
10000	673D109F010HP1C	0.895 x 2.650	24.0	18.0	7.33	20.0
12000	673D129F010HS1C	0.895 x 3.150	19.9	15.8	8.63	17.0
15000	673D159F010HT1C	0.895 x 3.650	17.3	13.8	9.85	16.0
3900	673D398F010JE1C	1.020 x 1.150	66.6	50.0	3.47	52.0
6800	673D688F010JJ1C	1.020 x 1.650	34.0	26.7	5.48	29.0
12000	673D129F010JL1C	1.020 x 2.150	24.0	19.0	7.18	21.0
15000	673D159F010JP1C	1.020 x 2.650	19.2	15.0	8.72	17.0
18000	673D189F010JS1C	1.020 x 3.150	16.0	13.0	10.20	15.0
22000	673D229F010JT1C	1.020 x 3.650	14.3	11.8	11.50	14.0
16 VOLTS DC WORKING; 20 VOLTS DC SURGE						
1200	673D128F016GE1C	0.770 x 1.150	129.0	83.0	2.24	85.0
2700	673D278F016GJ1C	0.770 x 1.650	65.0	43.0	3.62	45.0
3900	673D398F016GL1C	0.770 x 2.150	44.0	30.0	4.84	32.0
5600	673D568F016GP1C	0.770 x 2.650	34.0	23.5	6.01	26.0
6800	673D688F016GS1C	0.770 x 3.150	28.0	19.7	7.09	23.0
8200	673D828F016GT1C	0.770 x 3.650	24.0	17.0	8.16	21.0
2200	673D228F016HE1C	0.895 x 1.150	89.0	59.0	2.93	61.0
3900	673D398F016HJ1C	0.895 x 1.650	45.0	31.6	4.64	34.0
5600	673D568F016HL1C	0.895 x 2.150	31.6	22.4	6.14	25.0
8200	673D828F016HP1C	0.895 x 2.650	24.7	17.9	7.51	20.0
10000	673D109F016HS1C	0.895 x 3.150	20.7	15.2	8.79	18.0
12000	673D129F016HT1C	0.895 x 3.650	18.0	13.6	9.93	17.0

STANDARD RATINGS

μF	Catalog Number	Size (in) D x L	Max. ESR @ +25°C (mΩ) 120 Hz	Max. ESR @ +25°C (mΩ) 20k-40kHz	Max Ripple Current @ +85°C (A) 20k-40kHz	Max. Impedance @ 100 kHz (mΩ)
16 VOLTS DC WORKING; 20 VOLTS DC SURGE (Cont.)						
2700	673D278F016JE1C	1.020 x 1.150	71.0	50.0	3.49	52.0
5600	673D568F016JJ1C	1.020 x 1.650	36.7	26.7	5.48	29.0
8200	673D828F016JL1C	1.020 x 2.150	26.0	19.2	7.18	22.0
12000	673D129F016JP1C	1.020 x 2.650	20.5	15.4	8.75	19.0
15000	673D159F016JS1C	1.020 x 3.150	17.4	13.3	10.20	17.0
18000	673D189F016JT1C	1.020 x 3.650	15.3	11.8	11.50	17.0
25 VOLTS DC WORKING; 35 VOLTS DC SURGE						
820	673D827F025GE1C	0.770 x 1.150	143.0	85.0	2.23	88.0
1500	673D158F025GJ1C	0.770 x 1.650	73.0	44.0	3.56	47.0
2200	673D228F025GL1C	0.770 x 2.150	49.0	30.5	4.82	33.0
3300	673D338F025GP1C	0.770 x 2.650	37.0	23.9	5.96	27.0
3900	673D398F025GS1C	0.770 x 3.150	31.0	20.0	7.00	23.0
4700	673D478F025GT1C	0.770 x 3.650	26.7	17.5	8.04	21.0
1200	673D128F025HE1C	0.895 x 1.150	101.0	62.9	2.86	66.0
2700	673D278F025HJ1C	0.895 x 1.650	50.0	32.0	4.61	35.0
3900	673D398F025HL1C	0.895 x 2.150	35.0	22.9	6.08	26.0
4700	673D478F025HP1C	0.895 x 2.650	27.0	18.0	7.47	21.0
6800	673D688F025HS1C	0.895 x 3.150	22.7	15.4	8.74	19.0
8200	673D828F025HT1C	0.895 x 3.650	19.6	13.6	9.93	17.0
1800	673D188F025JE1C	1.020 x 1.150	79.0	51.0	3.45	53.0
3900	673D398F025JJ1C	1.020 x 1.650	40.0	26.9	5.46	30.0
5600	673D568F025JL1C	1.020 x 2.150	28.0	19.0	7.14	22.0
6800	673D688F025JP1C	1.020 x 2.650	22.0	15.7	8.66	19.0
8200	673D828F025JS1C	1.020 x 3.150	18.7	13.5	10.10	17.0
10000	673D109F025JT1C	1.020 x 3.650	16.4	12.0	11.40	15.0
35 VOLTS DC WORKING; 45 VOLTS DC SURGE						
560	673D567F035GE1C	0.770 x 1.150	191.0	86.0	2.22	89.0
1000	673D108F035GJ1C	0.770 x 1.650	94.0	47.0	3.57	67.0
1500	673D158F035GL1C	0.770 x 2.150	64.0	32.0	4.80	30.0
1800	673D188F035GP1C	0.770 x 2.650	49.0	25.0	5.92	27.0
2200	673D228F035GS1C	0.770 x 3.150	40.0	21.0	7.00	30.0
2700	673D278F035GT1C	0.770 x 3.650	34.8	18.6	8.02	21.0
680	673D687F035HE1C	0.895 x 1.150	130.0	64.0	3.00	62.0
1500	673D158F035HJ1C	0.895 x 1.650	67.0	33.0	4.54	36.0
2200	673D228F035HL1C	0.895 x 2.150	45.0	23.0	6.05	26.0
3300	673D338F035HP1C	0.895 x 2.650	34.0	18.4	7.41	22.0
3900	673D398F035HS1C	0.895 x 3.150	29.0	16.8	8.63	19.0
4700	673D478F035HT1C	0.895 x 3.650	25.8	14.8	9.85	17.0
1000	673D108F035JE1C	1.020 x 1.150	105.0	53.0	3.41	55.0
2200	673D228F035JJ1C	1.020 x 1.650	51.7	28.0	5.42	30.0
2700	673D278F035JL1C	1.020 x 2.150	36.0	20.0	7.49	23.0
3900	673D398F035JP1C	1.020 x 2.650	28.7	16.0	8.90	19.0
4700	673D478F035JS1C	1.020 x 3.150	23.8	13.0	10.60	17.0
5600	673D568F035JT1C	1.020 x 3.650	20.3	12.0	11.40	16.0
50 VOLTS DC WORKING; 75 VOLTS DC SURGE						
390	673D397F050GE1C	0.770 x 1.150	212.0	86.0	2.21	89.0
820	673D827F050GJ1C	0.770 x 1.650	105.0	44.0	3.57	47.0
1200	673D128F050GL1C	0.770 x 2.150	74.0	32.0	4.70	35.0
1500	673D158F050GP1C	0.770 x 2.650	56.0	25.0	5.83	28.0
1800	673D188F050GS1C	0.770 x 3.150	44.0	20.0	7.00	23.0
2200	673D228F050GT1C	0.770 x 3.650	37.7	17.7	8.00	21.0
560	673D567F050HE1C	0.895 x 1.150	145.0	59.0	2.87	62.0
1200	673D128F050HJ1C	0.895 x 1.650	76.0	34.0	4.46	37.0
1800	673D188F050HL1C	0.895 x 2.150	50.0	23.3	6.02	26.0
2200	673D228F050HP1C	0.895 x 2.650	39.0	18.7	7.35	22.0

STANDARD RATINGS

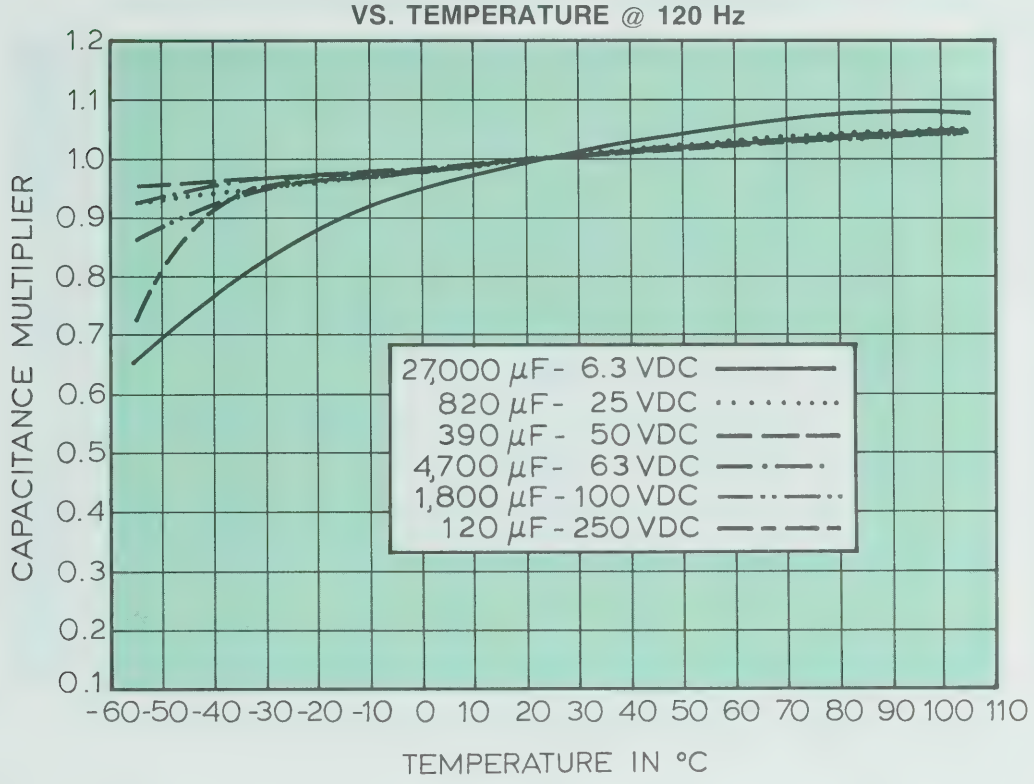
μF	Catalog Number	Size (in) D x L	Max. ESR @ +25°C (mΩ) 120 Hz	Max. ESR @ +25°C (mΩ) 20k-40kHz	Max Ripple Current @ +85°C (A) 20k-40kHz	Max. Impedance @ 100 kHz (mΩ)
50 VOLTS DC WORKING; 75 VOLTS DC SURGE (Cont.)						
2700	673D278F050HS1C	0.895 x 3.150	31.4	15.7	8.65	19.0
3300	673D338F050HT1C	0.895 x 3.650	27.0	13.9	9.82	17.0
820	673D827F050JE1C	1.020 x 1.150	112.0	51.4	3.45	54.0
1500	673D158F050JJ1C	1.020 x 1.650	58.0	27.8	5.37	31.0
2200	673D228F050JL1C	1.020 x 2.150	39.0	19.7	7.09	23.0
3300	673D338F050JP1C	1.020 x 2.650	30.0	15.9	8.61	20.0
3900	673D398F050JS1C	1.020 x 3.150	25.0	13.6	10.10	18.0
4700	673D478F050JT1C	1.020 x 3.650	21.6	12.0	11.40	16.0
63 VOLTS DC WORKING; 85 VOLTS DC SURGE						
330	673D337F063GE1C	0.770 x 1.150	236.0	89.0	2.13	93.0
680	673D687F063GJ1C	0.770 x 1.650	117.0	47.0	3.44	50.0
1000	673D108F063GL1C	0.770 x 2.150	79.0	33.3	4.61	36.0
1200	673D128F063GP1C	0.770 x 2.650	63.0	27.0	5.61	30.0
1800	673D188F063GS1C	0.770 x 3.150	49.9	22.0	6.71	25.0
2200	673D228F063GT1C	0.770 x 3.650	41.7	18.9	7.74	22.0
560	673D567F063HE1C	0.895 x 1.150	159.0	66.0	2.79	69.0
1000	673D108F063HJ1C	0.895 x 1.650	82.0	35.4	4.38	38.0
1500	673D158F063HL1C	0.895 x 2.150	54.0	24.5	5.87	28.0
2200	673D228F063HP1C	0.895 x 2.650	41.0	19.3	7.24	22.0
2700	673D278F063HS1C	0.895 x 3.150	34.6	16.6	8.42	20.0
3300	673D338F063HT1C	0.895 x 3.650	29.0	14.5	9.61	18.0
680	673D687F063JE1C	1.020 x 1.150	122.0	51.0	3.70	54.0
1500	673D158F063JJ1C	1.020 x 1.650	63.0	28.0	5.54	31.0
2200	673D228F063JL1C	1.020 x 2.150	42.0	20.6	6.93	24.0
2700	673D278F063JP1C	1.020 x 2.650	32.9	16.5	8.45	20.0
3900	673D398F063JS1C	1.020 x 3.150	27.0	14.0	9.85	18.0
4700	673D478F063JT1C	1.020 x 3.650	23.3	12.4	11.20	16.0
100 VOLTS DC WORKING; 125 VOLTS DC SURGE						
150	673D157F100GE1C	0.770 x 1.150	698.0	324.0	1.14	326.0
270	673D277F100GJ1C	0.770 x 1.650	329.0	154.0	1.92	156.0
390	673D397F100GL1C	0.770 x 2.150	221.0	104.0	2.60	106.0
560	673D567F100GP1C	0.770 x 2.650	164.0	78.0	3.39	80.0
680	673D687F100GS1C	0.770 x 3.150	131.0	63.0	3.96	65.0
820	673D827F100GT1C	0.770 x 3.650	110.0	53.0	4.60	54.0
220	673D227F100HE1C	0.895 x 1.150	452.0	212.0	1.55	215.0
390	673D397F100HJ1C	0.895 x 1.650	216.0	103.0	2.57	106.0
680	673D687F100HL1C	0.895 x 2.150	143.0	69.0	3.49	71.0
820	673D827F100HP1C	0.895 x 2.650	107.0	52.0	4.37	53.0
1000	673D108F100HS1C	0.895 x 3.150	89.0	44.0	5.15	45.0
1200	673D128F100HT1C	0.895 x 3.650	76.0	38.0	5.93	39.0
270	673D277F100JE1C	1.020 x 1.150	337.0	162.0	1.95	163.0
560	673D567F100JJ1C	1.020 x 1.650	163.0	79.0	3.17	81.0
820	673D827F100JL1C	1.020 x 2.150	109.0	54.0	4.27	55.0
1200	673D128F100JP1C	1.020 x 2.650	83.0	42.0	5.28	43.0
1500	673D158F100JS1C	1.020 x 3.150	67.0	34.0	6.29	35.0
1800	673D188F100JT1C	1.020 x 3.650	57.0	29.5	7.26	31.0
160 VOLTS DC WORKING; 200 VOLTS DC SURGE						
56	673D566F160GE1C	0.770 x 1.150	1733.0	881.0	0.694	895.0
100	673D107F160GJ1C	0.770 x 1.650	886.0	450.0	1.12	460.0
180	673D187F160GL1C	0.770 x 2.150	569.0	290.0	1.56	297.0
220	673D227F160GP1C	0.770 x 2.650	419.0	215.0	1.99	220.0
330	673D337F160GS1C	0.770 x 3.150	333.0	170.0	2.41	175.0
390	673D397F160GT1C	0.770 x 3.650	276.0	141.0	2.83	148.0
82	673D826F160HE1C	0.895 x 1.150	1152.0	588.0	0.936	592.0
180	673D187F160HL1C	0.895 x 1.650	579.0	296.0	1.51	300.0
270	673D277F160HL1C	0.895 x 2.150	376.0	193.0	2.09	198.0
390	673D397F160HP1C	0.895 x 2.650	279.0	143.0	2.66	148.0
470	673D477F160HT1C	0.895 x 3.150	222.0	115.0	3.19	120.0
560	673D567F160HT1C	0.895 x 3.650	185.0	96.0	3.74	100.0

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size (in) D x L	Max. ESR @ +25°C (mΩ) 120 Hz	Max. ESR @ +25°C (mΩ) 20k-40kHz	Max Ripple Current @ +85°C (A) 20k-40kHz	Max. Impedance @ 100 kHz (mΩ)
160 VOLTS DC WORKING; 200 VOLTS DC SURGE (Cont.)						
120	673D127F160JE1C	1.020 x 1.150	852.0	438.0	1.18	445.0
270	673D277F160JJ1C	1.020 x 1.650	415.0	214.0	1.94	220.0
390	673D397F160JL1C	1.020 x 2.150	275.0	142.0	2.64	148.0
470	673D477F160JP1C	1.020 x 2.650	202.0	105.0	3.35	108.0
560	673D567F160JS1C	1.020 x 3.150	163.0	84.0	4.03	88.0
680	673D687F160JT1C	1.020 x 3.650	137.0	71.0	4.69	74.0
200 VOLTS DC WORKING; 250 VOLTS DC SURGE						
39	673D396F200GE1C	0.770 x 1.150	2290.0	1000.0	0.651	1040.0
82	673D826F200GJ1C	0.770 x 1.650	1110.0	484.0	1.08	490.0
100	673D107F200GL1C	0.770 x 2.150	762.0	337.0	1.45	341.0
150	673D157F200GP1C	0.770 x 2.650	557.0	246.0	1.86	250.0
180	673D187F200GS1C	0.770 x 3.150	439.0	195.0	2.25	200.0
220	673D227F200GT1C	0.770 x 3.650	363.0	161.0	2.65	168.0
56	673D566F200HE1C	0.895 x 1.150	1510.0	670.0	0.878	680.0
100	673D107F200HJ1C	0.895 x 1.650	775.0	343.0	1.41	348.0
180	673D187F200HL1C	0.895 x 2.150	498.0	221.0	1.96	230.0
220	673D227F200HP1C	0.895 x 2.650	367.0	163.0	2.49	168.0
270	673D227F200HS1C	0.895 x 3.150	291.0	130.0	3.01	135.0
330	673D337F200HT1C	0.895 x 3.650	242.0	108.0	3.53	112.0
82	673D826F200JE1C	1.020 x 1.150	1090.0	486.0	1.13	492.0
150	673D157F200JJ1C	1.020 x 1.650	528.0	240.0	1.83	246.0
220	673D227F200JL1C	1.020 x 2.150	356.0	160.0	2.49	168.0
330	673D337F200JP1C	1.020 x 2.650	267.0	120.0	3.13	124.0
390	673D397F200JS1C	1.020 x 3.150	214.0	97.0	3.76	101.0
470	673D477F200JT1C	1.020 x 3.650	179.0	80.0	4.42	84.0
250 VOLTS DC WORKING; 300 VOLTS DC SURGE						
27	673D276F250GE1C	0.770 x 1.150	2400.0	700.0	0.771	710.0
56	673D566F250GJ1C	0.770 x 1.650	1147.0	338.0	1.29	348.0
82	673D826F250GL1C	0.770 x 2.150	754.0	232.0	1.77	240.0
100	673D107F250GP1C	0.770 x 2.650	587.0	178.0	2.19	186.0
150	673D157F250GS1C	0.770 x 3.150	461.0	137.0	2.67	143.0
180	673D187F250GT1C	0.770 x 3.650	379.0	117.0	3.13	122.0
39	673D396F250HE1C	0.895 x 1.150	1579.0	467.0	1.05	476.0
82	673D826F250HJ1C	0.895 x 1.650	766.0	237.0	1.72	246.0
120	673D127F250HL1C	0.895 x 2.150	503.0	158.0	2.35	166.0
180	673D187F250HP1C	0.895 x 2.650	383.0	119.0	2.94	125.0
220	673D227F250HS1C	0.895 x 3.150	310.0	92.0	3.51	97.0
270	673D277F250HT1C	0.895 x 3.650	251.0	78.0	4.15	83.0
56	673D566F250JE1C	1.020 x 1.150	1140.0	345.0	1.33	354.0
120	673D127F250JJ1C	1.020 x 1.650	554.0	243.0	2.17	252.0
180	673D187F250JL1C	1.020 x 2.150	367.0	116.0	2.95	122.0
220	673D227F250JP1C	1.020 x 2.650	257.0	87.0	3.71	91.0
270	673D277F250JS1C	1.020 x 3.150	220.0	69.0	4.44	74.0
330	673D337F250JT1C	1.020 x 3.650	184.0	58.0	5.16	63.0

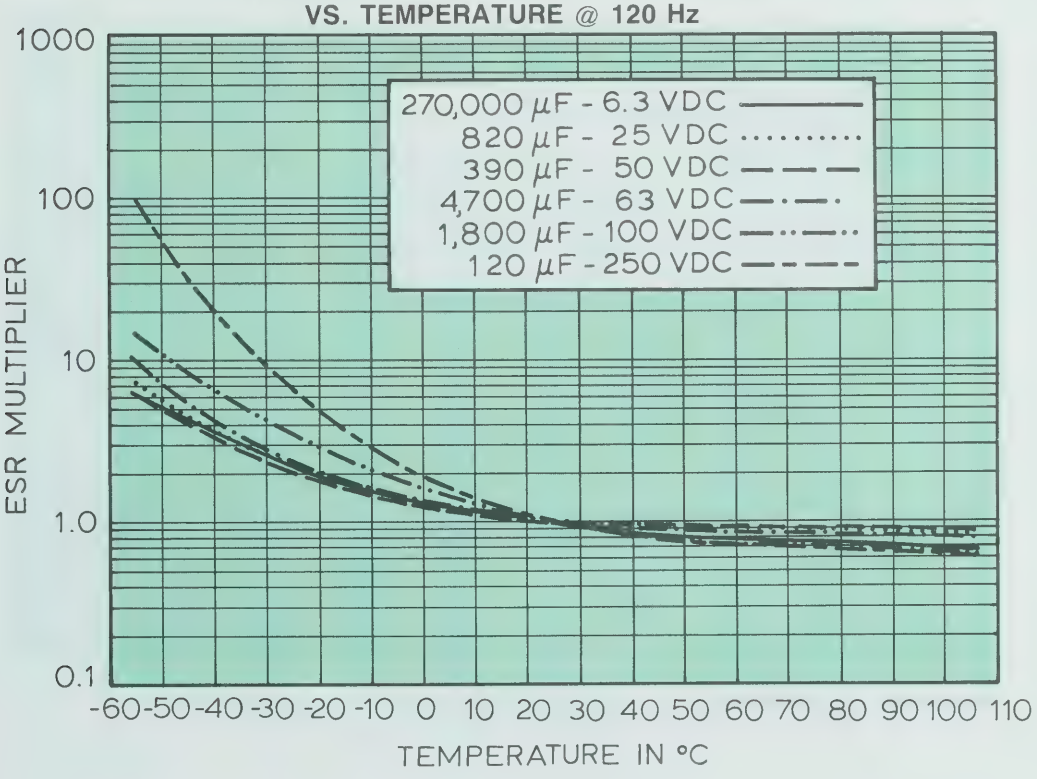
TYPICAL CURVES

TYPE 673D — TYPICAL CAPACITANCE MULTIPLIER
VS. TEMPERATURE @ 120 Hz



Dwg. No. A-14,723

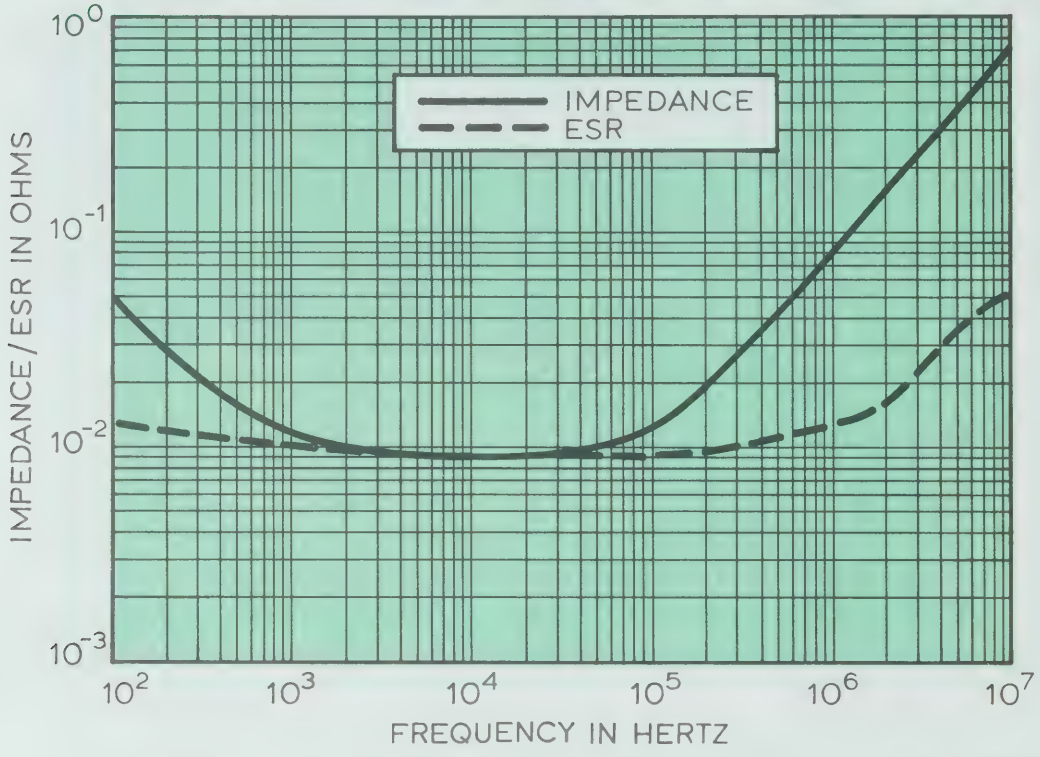
TYPE 673D — TYPICAL ESR MULTIPLIER
VS. TEMPERATURE @ 120 Hz



Dwg. No. A-14,715

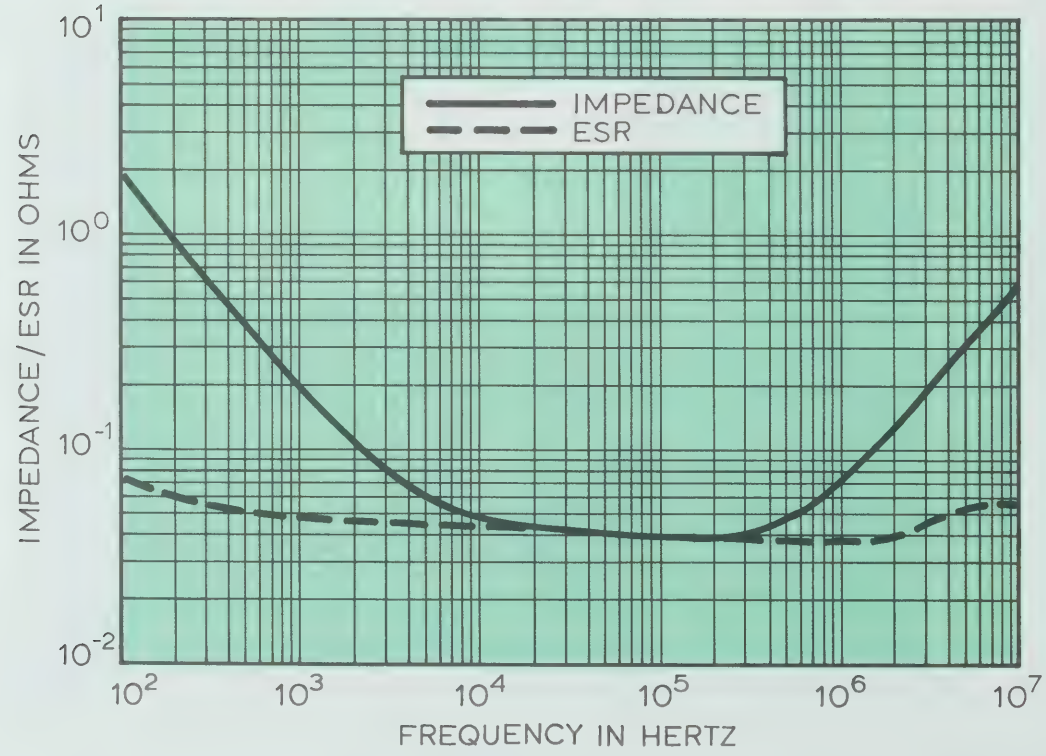
TYPICAL CURVES @ +25°C

TYPE 673D/674D — 27000μF @ 6.3VDC, JT CASE SIZE



Dwg. No. A-14,759

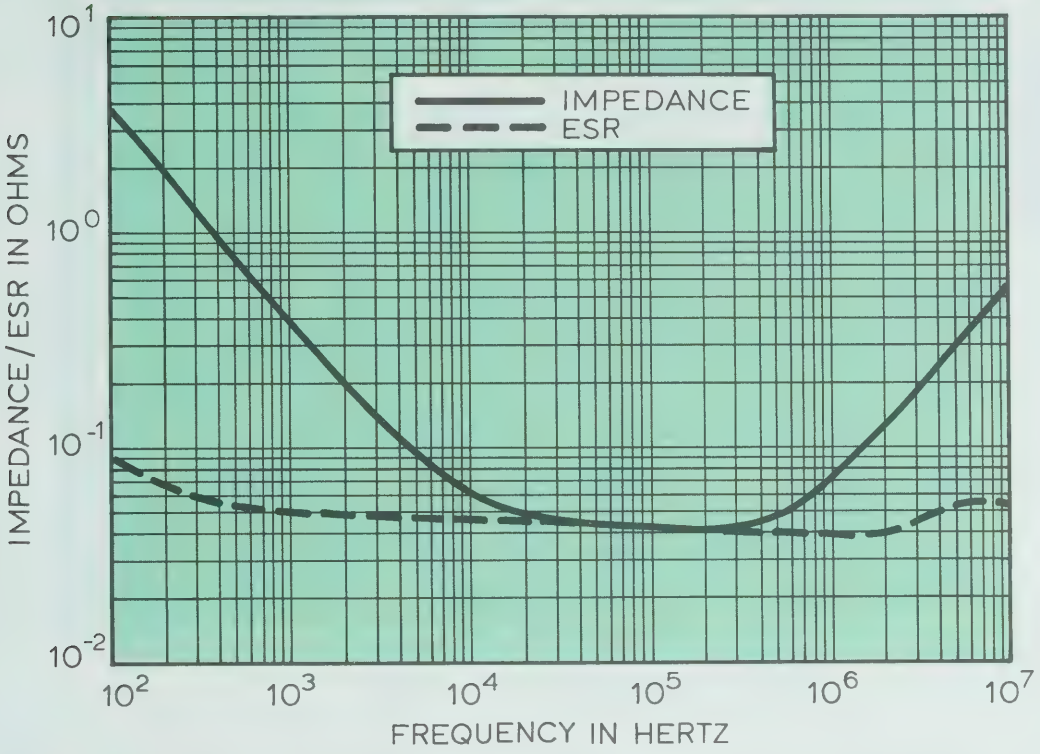
TYPE 673D/674D — 820μF @ 25VDC, GE CASE SIZE



Dwg. No. A-14,758

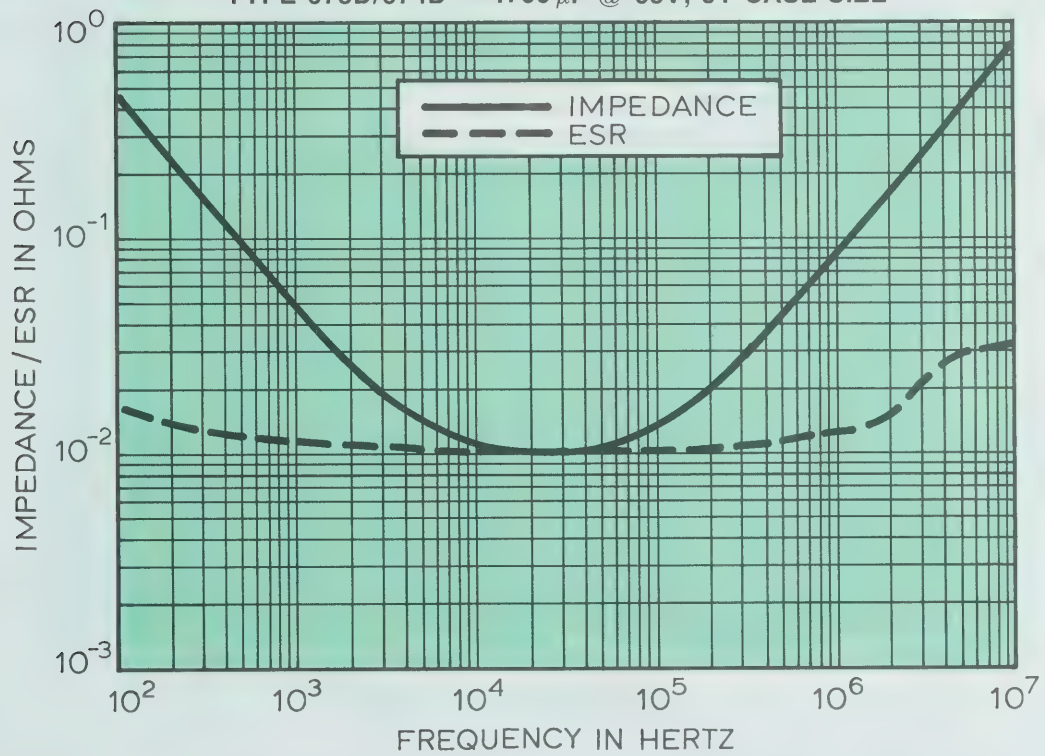
TYPICAL CURVES @ +25°C

TYPE 673D/674D — 390μF @ 50VDC, GE CASE SIZE



Dwg. No. A-14,756

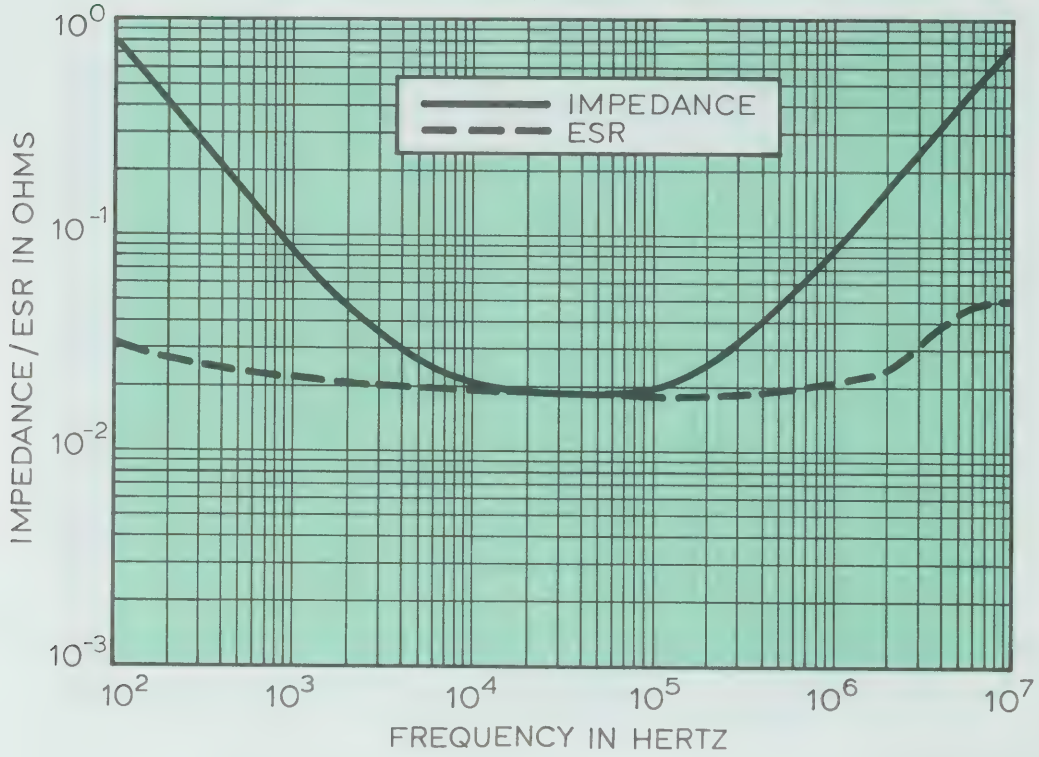
TYPE 673D/674D — 4700μF @ 63V, JT CASE SIZE



Dwg. No. A-14,757

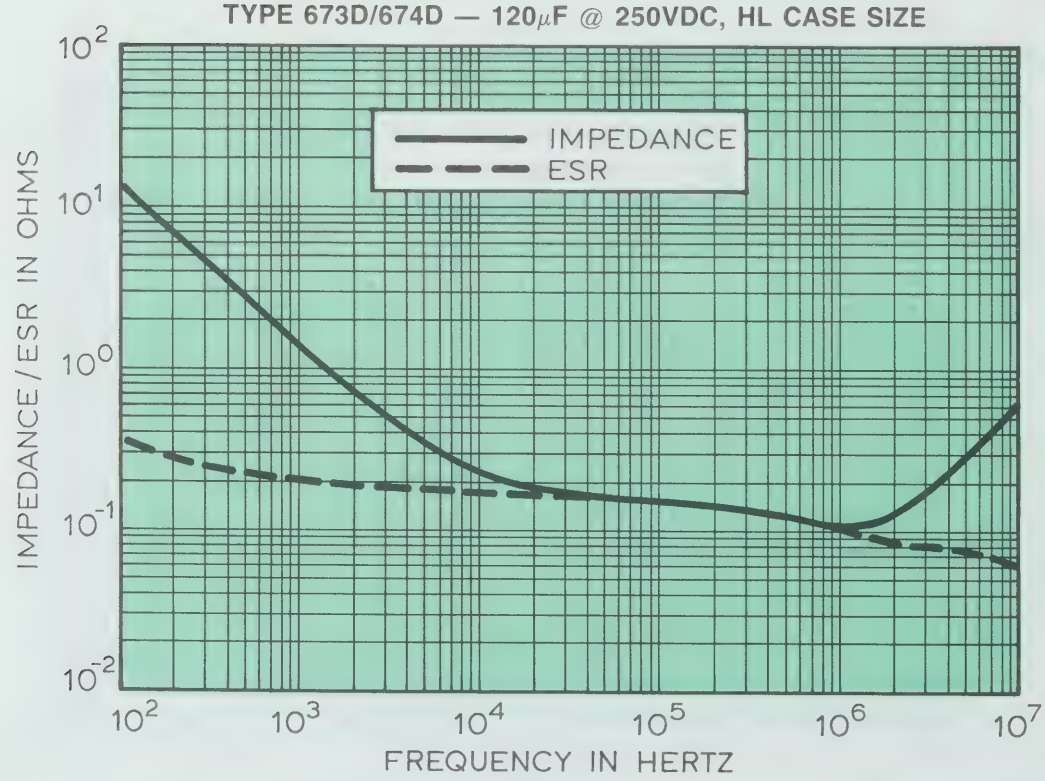
TYPICAL CURVES @ +25°C

TYPE 673D/674D — 1800μF @ 100VDC, JT CASE SIZE



Dwg. No. A-14,755

TYPE 673D/674D — 120μF @ 250VDC, HL CASE SIZE



Dwg. No. A-14,754

+105°C Tubular Radial Lead Aluminum Capacitors

L65-11

Features —

- **Low Impedance**
- **Low ESR**
- **Symmetrical ESR (±30%), and Capacitance (±20%)**

General Specifications —

Operating Temperature:
−55°C to +105°C.

Voltage Range: 6.3 - 63 VDC.

Capacitance Range: 220μF - 39,000μF.

Capacitance Tolerance: ±20%.

Case Size Range: 0.75″ x 1.125″ - 1.0″ x 3.625″.

Termination: Radial leads.

Life Validation Test: 2000 hrs @ +105°C:
Δ CAP ≤ 15% from initial measurement.
Δ ESR ≤ 1.5x initial specified limit.
Δ DCL ≤ initial specified limit.

Shelf Test: 500 hrs @ +105°C:
Δ CAP ≤ 10% from initial measurement.
Δ ESR ≤ 1.15x initial specified limit.
Δ DCL ≤ 2x initial specified limit.

DC Leakage Current: after 5 min. charge.
$I = K\sqrt{CV}$
K = 0.5 @ +25°C
I in μa, C in μF, V in Volts

Ripple Current Multipliers:

TEMPERATURE

Ambient Temp.	+105°C	+85°C	+65°C	+45°C	+25°C
Multiplier	0.45	1.0	1.3	1.6	1.8

FREQUENCY Hz

Rated WVDC	50-60	100-120	300-400	1000	20K-100K
6.3 to 63	0.60	0.75	0.80	0.90	1.0

Low Temperature Performance:
Capacitance Ratio $C^{-55°C}/C^{+25°C}$ min. @ 120Hz

Rated Voltage (VDC)	Ratio
6.3-25	0.75
40-63	0.8

ESR Ratio $ESR^{-55°C}/ESR^{+25°C}$ max. @ 120Hz

Rated Voltage (VDC)	Ratio
6.3-25	8
40-63	10

Performance Characteristics —

SEE PAGE 2.

Catalog Numbering System

676D 338 M 6R3 GE 1 C

LEAD CODE. C = 2 LEAD RADIAL MOUNT (676D).
J = 3 LEAD AXIAL MOUNT (Optional on 676D).
A = KEYED POLARITY 3 LEAD RADIAL MOUNT (677D).

CASE STYLE. 1 = PVC INSULATING SLEEVE (Standard for +105°C Operation).
7 = PVC SLEEVE WITH RESIN END SEAL (Optional).
(Required for exposure to halogenated cleaning solvents).

CASE CODE. SEE DIMENSIONS, BELOW.

DC VOLTAGE RATING. EXPRESSED IN VOLTS. AN 'R' IS USED AS A DECIMAL POINT. FOR EXAMPLE: 6R3 = 6.3 VOLTS.

CAPACITANCE TOLERANCE. M = ±20%.

CAPACITANCE. EXPRESSED IN PICOFARADS. THE FIRST TWO DIGITS ARE SIGNIFICANT FIGURES. THE THIRD IS THE NUMBER OF ZEROS.

TYPE NUMBER. IDENTIFIES THE BASIC CAPACITOR DESIGN.
676D = LEAD CODES C AND J ONLY.
677D = LEAD CODE A ONLY.

DIMENSIONS IN INCHES

CASE CODE	STYLE 1 STYLE 7 D ±0.015	L ±0.062	OVERALL LENGTH H MAX.	LEAD SPACING* S ±0.015	TYPICAL WEIGHT (oz)
GE	0.770	1.150	1.246	0.250	0.46
GJ	0.770	1.650	1.746	0.250	0.64
GL	0.770	2.150	2.246	0.250	0.81
GP	0.770	2.650	2.746	0.250	0.99
GS	0.770	3.150	3.246	0.250	1.16
GT	0.770	3.650	3.746	0.250	1.34
HE	0.895	1.150	1.246	0.300	0.63
HJ	0.895	1.650	1.746	0.300	0.88
HL	0.895	2.150	2.246	0.300	1.09
HP	0.895	2.650	2.746	0.300	1.34
HS	0.895	3.150	3.246	0.300	1.59
HT	0.895	3.650	3.746	0.300	1.83
JE	1.020	1.150	1.246	0.400	0.81
JJ	1.020	1.650	1.746	0.400	1.13
JL	1.020	2.150	2.246	0.400	1.45
JP	1.020	2.650	2.746	0.400	1.76
JS	1.020	3.150	3.246	0.400	2.08
JT	1.020	3.650	3.746	0.400	2.40

*Type 676D Only.

DIMENSIONS IN MILLIMETERS

CASE CODE	STYLE 1 STYLE 7 D ±0.4	L ±1.6	OVERALL LENGTH H MAX.	LEAD SPACING* S ±0.4	TYPICAL WEIGHT (grams)
GE	19.6	29.2	31.6	6.4	13
GJ	19.6	41.9	44.3	6.4	18
GL	19.6	54.6	57.0	6.4	23
GP	19.6	67.3	69.7	6.4	28
GS	19.6	80.0	82.4	6.4	33
GT	19.6	92.7	95.1	6.4	38
HE	22.7	29.2	31.6	7.6	18
HJ	22.7	41.9	44.3	7.6	25
HL	22.7	54.6	57.0	7.6	31
HP	22.7	67.3	69.7	7.6	38
HS	22.7	80.0	82.4	7.6	45
HT	22.7	92.7	95.1	7.6	52
JE	25.9	29.2	31.6	10.2	23
JJ	25.9	41.9	44.3	10.2	32
JL	25.9	54.6	57.0	10.2	41
JP	25.9	67.3	69.7	10.2	50
JS	25.9	80.0	82.4	10.2	59
JT	25.9	92.7	95.1	10.2	68

*Type 676D Only.

STANDARD RATINGS

µF	Catalog Number	Nominal Case Size (inches) D ±0.015	x	L ±0.062	@ +25°C (mΩ) 120Hz Max.	20K-100kHz ±30%	Max. Ripple Current +85°C (A) 120Hz	20-100kHz	Max. Impedance @ +25°C (mΩ) 100kHz
6.3 VOLTS DC WORKING; 9 VDC SURGE									
3300	676D338M6R3GE1C	0.750	x	1.125	98.0	42.9	1.89	2.76	57.8
6800	676D688M6R3GJ1C	0.750	x	1.625	52.0	22.6	3.13	4.38	31.4
10000	676D109M6R3GL1C	0.750	x	2.125	37.0	16.2	4.24	5.79	23.1
12000	676D129M6R3GP1C	0.750	x	2.625	28.0	12.9	5.24	7.11	18.8
18000	676D189M6R3GS1C	0.750	x	3.125	23.0	11.1	6.24	8.27	16.4
22000	676D229M6R3GT1C	0.750	x	3.625	20.0	9.8	7.20	9.43	14.7
4700	676D478M6R3HE1C	0.875	x	1.125	9.1	25.9	2.62	3.91	36.7
10000	676D109M6R3HJ1C	0.875	x	1.625	5.0	13.5	4.30	6.22	20.6
15000	676D159M6R3HL1C	0.875	x	2.125	4.1	9.5	5.76	8.27	15.4
22000	676D229M6R3HP1C	0.875	x	2.625	8.7	7.6	7.19	10.11	12.9
27000	676D279M6R3HS1C	0.875	x	3.125	5.5	6.4	8.51	11.88	11.3
33000	676D339M6R3HT1C	0.875	x	3.625	3.4	5.6	9.64	13.58	10.3
6800	676D688M6R3JE1C	1.000	x	1.125	4.3	21.3	3.25	4.70	31.7
15000	676D159M6R3JJ1C	1.000	x	1.625	7.8	11.2	5.22	7.42	18.6
22000	676D229M6R3JL1C	1.000	x	2.125	9.3	8.0	7.01	9.75	14.4
27000	676D279M6R3JP1C	1.000	x	2.625	5.2	6.4	8.63	11.89	12.3
33000	676D339M6R3JS1C	1.000	x	3.125	2.7	5.5	9.98	13.83	11.2
39000	676D399M6R3JT1C	1.000	x	3.625	1.0	4.9	11.68	15.64	10.4
10 VOLTS DC WORKING; 14 VDC SURGE									
2700	676D278M010GE1C	0.750	x	1.125	123.0	43.0	1.80	2.75	57.9
5600	676D568M010GJ1C	0.750	x	1.625	61.0	22.6	2.92	4.38	31.4
8200	676D828M010GL1C	0.750	x	2.125	40.0	16.2	3.95	5.79	23.1
10000	676D109M010GP1C	0.750	x	2.625	31.0	12.9	4.93	7.11	18.8
12000	676D129M010GS1C	0.750	x	3.125	26.0	11.1	5.87	8.27	16.4
15000	676D159M010GT1C	0.750	x	3.625	23.0	9.9	6.76	9.38	14.9
3300	676D338M010HE1C	0.875	x	1.125	80.5	25.9	2.41	3.91	36.7
6800	676D688M010HJ1C	0.875	x	1.625	40.5	13.5	3.98	6.22	20.6
10000	676D109M010HL1C	0.875	x	2.125	27.7	9.5	5.41	8.27	15.4
12000	676D129M010HP1C	0.875	x	2.625	21.4	7.6	6.70	10.11	12.9
15000	676D159M010HS1C	0.875	x	3.125	17.7	6.4	7.99	11.88	11.3
22000	676D229M010HT1C	0.875	x	3.625	15.2	5.6	9.23	13.58	10.3
5600	676D568M010JE1C	1.000	x	1.125	62.8	21.3	3.03	4.70	31.7
10000	676D109M010JJ1C	1.000	x	1.625	31.9	11.2	4.89	7.42	18.6
15000	676D159M010JL1C	1.000	x	2.125	22.0	8.0	6.53	9.75	14.4
22000	676D229M010JP1C	1.000	x	2.625	17.2	6.5	8.13	11.88	12.5
27000	676D279M010JS1C	1.000	x	3.125	14.3	5.5	9.60	13.83	11.2
33000	676D339M010JT1C	1.000	x	3.625	12.4	4.9	10.69	15.64	10.4
16 VOLTS DC WORKING; 20 VDC SURGE									
1500	676D158M016GE1C	0.750	x	1.125	144.0	43.1	1.60	2.75	58.0
2700	676D278M016GJ1C	0.750	x	1.625	72.0	22.7	2.61	4.37	31.5
3900	676D398M016GL1C	0.750	x	2.125	49.0	16.2	3.55	5.79	23.1
5600	676D568M016GP1C	0.750	x	2.625	38.0	13.0	4.44	7.08	18.9
8200	676D828M016GS1C	0.750	x	3.125	31.0	11.1	5.30	8.27	16.4
10000	676D109M016GT1C	0.750	x	3.625	26.0	9.9	6.13	9.38	14.9
2200	676D228M016HE1C	0.875	x	1.125	86.0	26.0	2.19	3.90	36.8
4700	676D478M016HJ1C	0.875	x	1.625	47.0	13.6	3.55	6.20	20.7
6800	676D688M016HL1C	0.875	x	2.125	30.0	9.6	4.76	8.23	15.5
8200	676D828M016HP1C	0.875	x	2.625	24.0	7.6	6.01	10.11	12.9
10000	676D109M016HS1C	0.875	x	3.125	20.0	6.4	7.21	11.88	11.3
12000	676D129M016HT1C	0.875	x	3.625	17.0	5.6	8.29	13.58	10.3

STANDARD RATINGS

µF	Catalog Number	Nominal Case Size (inches) D ±0.015	x	L ±0.062	@ +25°C (mΩ) 120Hz Max.	20K-100kHz ±30%	Max. Ripple Current +85°C (A) 120Hz	20-100kHz	Max. Impedance @ +25°C (mΩ) 100kHz
16 VOLTS DC WORKING; 20 VDC SURGE (Cont.)									
3300	676D338M016JE1C	1.000	x	1.125	74.0	21.3	2.70	4.70	31.7
5600	676D568M016JJ1C	1.000	x	1.625	37.0	11.2	4.37	7.42	18.6
8200	676D828M016JL1C	1.000	x	2.125	25.0	8.0	5.88	9.75	14.4
12000	676D129M016JP1C	1.000	x	2.625	20.0	6.5	7.31	11.80	12.5
15000	676D159M016JS1C	1.000	x	3.125	17.0	5.5	8.68	13.83	11.2
18000	676D189M016JT1C	1.000	x	3.625	15.0	4.9	9.98	15.64	10.4
25 VOLTS DC WORKING; 35 VDC SURGE									
1000	676D108M025GE1C	0.750	x	1.125	154.0	43.2	1.54	2.74	58.2
1800	676D188M025GJ1C	0.750	x	1.625	77.0	22.7	2.53	4.35	31.5
3300	676D338M025GL1C	0.750	x	2.125	52.0	16.3	3.37	5.77	23.2
3900	676D398M025GP1C	0.750	x	2.625	40.0	13.0	4.29	7.08	18.9
5600	676D568M025GS1C	0.750	x	3.125	33.0	11.1	5.07	8.27	16.4
6800	676D688M025GT1C	0.750	x	3.625	28.0	9.9	5.93	9.38	14.9
1500	676D158M025HE1C	0.875	x	1.125	103.0	26.0	2.10	3.90	36.8
3600	676D368M025HJ1C	0.875	x	1.625	52.0	13.6	3.37	6.20	20.7
4700	676D478M025HL1C	0.875	x	2.125	36.0	9.6	4.62	8.23	15.5
5600	676D568M025HP1C	0.875	x	2.625	28.0	7.6	5.80	10.11	12.9
8200	676D828M025HS1C	0.875	x	3.125	23.0	6.4	6.95	11.88	11.3
10000	676D109M025HT1C	0.875	x	3.625	20.0	5.6	8.06	13.58	10.3
2200	676D228M025JE1C	1.000	x	1.125	80.0	21.3	2.62	4.70	31.7
3900	676D398M025JJ1C	1.000	x	1.625	41.0	11.2	4.22	7.42	18.7
5600	676D568M025JL1C	1.000	x	2.125	28.0	8.0	5.68	9.75	14.4
8200	676D828M025JP1C	1.000	x	2.625	22.6	6.5	7.06	11.80	12.5
10000	676D109M025JS1C	1.000	x	3.125	19.0	5.5	8.45	13.83	11.2
12000	676D129M025JT1C	1.000	x	3.625	16.0	4.9	9.76	15.64	10.4
35 VOLTS DC WORKING; 50 VDC SURGE									
820	676D827M035GE1C	0.750	x	1.125	219.0	43.5	1.27	2.74	58.6
1500	676D158M035GJ1C	0.750	x	1.625	108.0	22.9	2.11	4.35	31.8
2200	676D228M035GL1C	0.750	x	2.125	73.0	16.3	2.87	5.77	23.2
3300	676D338M035GP1C	0.750	x	2.625	56.0	13.1	3.62	7.05	19.0
3900	676D398M035GS1C	0.750	x	3.125	45.0	11.2	4.23	8.23	16.6
4700	676D478M035GT1C	0.750	x	3.625	38.0	9.9	4.98	9.38	14.9
1200	676D128M035HE1C	0.875	x	1.125	142.0	26.3	1.74	3.88	37.2
2200	676D228M035HJ1C	0.875	x	1.625	70.0	13.6	2.85	6.20	20.7
3300	676D338M035HL1C	0.875	x	2.125	46.0	9.6	3.83	8.23	15.5
4700	676D478M035HP1C	0.875	x	2.625	35.0	7.6	4.81	10.11	12.9
5600	676D568M035HS1C	0.875	x	3.125	29.0	6.5	5.77	11.79	11.5
6800	676D688M035HT1C	0.875	x	3.625	25.0	5.7	6.69	13.46	10.4
1500	676D158M035JE1C	1.000	x	1.125	111.0	21.6	2.17	4.66	32.1
3300	676D338M035JJ1C	1.000	x	1.625	55.0	11.3	3.54	7.38	18.7
4700	676D478M035JL1C	1.000	x	2.125	38.0	8.1	4.72	9.69	14.5
6800	676D688M035JP1C	1.000	x	2.625	29.0	6.5	5.98	11.80	12.5
8200	676D828M035JS1C	1.000	x	3.125	24.0	5.5	7.08	13.83	11.2
10000	676D109M035JT1C	1.000	x	3.625	21.0	4.9	8.27	15.64	10.4

STANDARD RATINGS

µF	Catalog Number	Nominal Case Size (inches) D ±0.015	x	L ±0.062	@ +25°C (mΩ) 120Hz Max.	20K-100kHz ±30%	Max. Ripple Current +85°C (A) 120Hz	20-100kHz	Max. Impedance @ +25°C (mΩ) 100kHz
50 VOLTS DC WORKING; 75 VDC SURGE									
390	676D397M050GE1C	0.750	x	1.125	290.0	49.7	1.11	2.56	66.6
820	676D827M050GJ1C	0.750	x	1.625	143.0	25.9	1.83	4.09	35.7
1200	676D128M050GL1C	0.750	x	2.125	96.0	18.3	2.50	5.45	25.8
1500	676D158M050GP1C	0.750	x	2.625	72.0	14.6	3.17	6.68	21.0
1800	676D188M050GS1C	0.750	x	3.125	59.0	12.3	3.79	7.85	18.0
2200	676D228M050GT1C	0.750	x	3.625	50.0	10.9	4.41	8.94	16.2
330	676D337M050HE1C	0.875	x	1.125	188.0	30.3	1.50	3.61	42.4
1200	676D128M050HJ1C	0.875	x	1.625	92.0	15.6	2.49	5.79	23.3
1800	676D188M050HL1C	0.875	x	2.125	62.0	10.9	3.38	7.72	17.2
2200	676D228M050HP1C	0.875	x	2.625	47.0	8.6	4.24	9.50	14.2
3300	676D338M050HS1C	0.875	x	3.125	38.0	7.2	5.09	11.20	12.4
3900	676D398M050HT1C	0.875	x	3.625	32.0	6.3	5.92	12.81	11.2
820	676D827M050JE1C	1.000	x	1.125	143.0	24.6	1.88	4.37	36.0
1500	676D158M050JJ1C	1.000	x	1.625	71.0	12.8	3.09	6.94	20.6
2200	676D228M050JL1C	1.000	x	2.125	48.0	9.1	4.16	9.14	15.8
3300	676D338M050JP1C	1.000	x	2.625	36.0	7.2	5.22	11.21	13.4
3900	676D398M050JS1C	1.000	x	3.125	28.0	6.2	6.24	13.02	12.1
4700	676D478M050JT1C	1.000	x	3.625	24.0	5.4	7.23	14.90	11.2
63 VOLTS DC WORKING; 85 VDC SURGE									
220	676D227M063GE1C	0.750	x	1.125	400.0	50.03	0.94	2.54	67.4
470	676D477M063GJ1C	0.750	x	1.625	197.0	26.2	1.56	4.07	36.1
680	676D687M063GL1C	0.750	x	2.125	131.0	18.5	2.14	5.42	26.1
1000	676D108M063GP1C	0.750	x	2.625	99.0	14.7	2.70	6.66	21.1
1200	676D128M063GS1C	0.750	x	3.125	80.0	12.5	3.25	7.79	18.3
1500	676D158M063GT1C	0.750	x	3.625	67.0	11.0	3.82	8.90	16.3
330	676D337M063HE1C	0.875	x	1.125	262.0	30.7	1.26	3.59	52.9
680	676D687M063HJ1C	0.875	x	1.625	128.0	15.8	2.11	5.75	23.1
1000	676D108M063HL1C	0.875	x	2.125	85.0	11.0	2.89	7.69	17.3
1200	676D128M063HP1C	0.875	x	2.625	64.0	8.7	3.65	9.44	14.3
1800	676D188M063HS1C	0.875	x	3.125	52.0	7.3	4.37	11.13	12.5
2200	676D228M063HT1C	0.875	x	3.625	43.0	6.4	4.94	12.70	11.3
470	676D477M063JE1C	1.000	x	1.125	198.0	24.1	1.6	4.41	35.3
820	676D827M063JJ1C	1.000	x	1.625	97.0	12.9	2.62	6.91	20.8
1200	676D128M063JL1C	1.000	x	2.125	65.0	9.2	3.59	9.09	16.0
1800	676D188M063JP1C	1.000	x	2.625	49.0	7.3	4.4	11.14	13.5
2200	676D228M063JS1C	1.000	x	3.125	40.0	6.2	5.37	13.02	12.1
2700	676D278M063JT1C	1.000	x	3.625	33.0	5.5	6.14	14.77	11.2

+105°C Tubular Radial Lead Aluminum Capacitors

L65-22

Features —

- Long Life and Stability
- Low Impedance
- Low ESR
- High Ripple Current Capability
- High Capacitance

General Specifications —

Operating Temperature:
−55°C to +105°C.

Voltage Range: 6.3 - 35 VDC.

Capacitance Range: 820μF - 39,000μF.

Capacitance Tolerance: ±20%.

Case Size Range: 0.75″ x 1.125″ - 1.0″ x 3.625″ (19mm x 29mm - 25mm x 92mm).

Termination: Radial leads.

Life Validation Test: 5000 hrs @ +105°C:
Δ CAP ≤ 15% from initial measurement.
Δ ESR ≤ 1.25x initial specified limit.
Δ DCL ≤ initial specified limit.
Δ Z ≤ 1.75x initial measurement.

Shelf Test: 500 hrs @ +105°C:
Δ CAP ≤ 10% from initial measurement.
Δ ESR ≤ 1.10x initial specified limit.
Δ DCL ≤ 2x initial specified limit.

DC Leakage Current: 5 min. charge time.
$I = 0.5\sqrt{CV}$ @ +25°C
I in μA, C in μF, V in Volts

Ripple Current Multipliers:

TEMPERATURE

Ambient Temp.	+105°C	+85°C	+65°C	+45°C	+25°C
Multiplier	0.6	1.0	1.2	1.4	1.6

FREQUENCY Hz

Rated WVDC	400	1000	20K-100K
6.3 to 35	0.75	0.82	1.0

Low Temperature Performance:
Capacitance Ratio $C^{-55°C}/C^{+25°C}$ min. @ 120Hz

Rated Voltage (VDC)	Ratio
6.3-35	0.8

Impedance Ratio $Z^{-55°C}/Z^{+25°C}$ max. @ 120Hz

Rated Voltage (VDC)	120Hz	20k - 100kHz
6.3-35	3	30

Performance Characteristics —

SEE PAGE 2.

Catalog Numbering System

767D 332 M 6R3 GE 1 C

LEAD CODE. C = 2 LEAD RADIAL (Standard).
J = 3 LEAD AXIAL.
A = KEYED POLARITY 3 LEAD RADIAL.

CASE STYLE. 1 = PVC INSULATING SLEEVE (Standard).
7 = PVC SLEEVE WITH RESIN END SEAL (Optional).
(Required for exposure to halogenated cleaning solvents).

CASE CODE. SEE DIMENSIONS, BELOW.

DC VOLTAGE RATING. EXPRESSED IN VOLTS. AN 'R' IS USED AS A DECIMAL POINT. FOR EXAMPLE: 6R3 = 6.3 VOLTS.

CAPACITANCE TOLERANCE. M = ±20%.

CAPACITANCE. EXPRESSED IN PICOFARADS. THE FIRST TWO DIGITS ARE SIGNIFICANT FIGURES. THE THIRD IS THE NUMBER OF ZEROS.

TYPE NUMBER. IDENTIFIES THE BASIC CAPACITOR DESIGN.

DIMENSIONS IN INCHES

CASE CODE	STYLE 1 STYLE 7 D ±0.015	STYLE 1 STYLE 7 L ±0.062	OVERALL LENGTH H MAX.	LEAD SPACING* S ±0.015	TYPICAL WEIGHT (oz)
GE	0.770	1.150	1.246	0.250	0.46
GJ	0.770	1.650	1.746	0.250	0.64
GL	0.770	2.150	2.246	0.250	0.81
GP	0.770	2.650	2.746	0.250	0.99
GS	0.770	3.150	3.246	0.250	1.16
GT	0.770	3.650	3.746	0.250	1.34
HE	0.895	1.150	1.246	0.300	0.63
HJ	0.895	1.650	1.746	0.300	0.88
HL	0.895	2.150	2.246	0.300	1.09
HP	0.895	2.650	2.746	0.300	1.34
HS	0.895	3.150	3.246	0.300	1.59
HT	0.895	3.650	3.746	0.300	1.83
JE	1.020	1.150	1.246	0.400	0.81
JJ	1.020	1.650	1.746	0.400	1.13
JL	1.020	2.150	2.246	0.400	1.45
JP	1.020	2.650	2.746	0.400	1.76
JS	1.020	3.150	3.246	0.400	2.08
JT	1.020	3.650	3.746	0.400	2.40

DIMENSIONS IN MILLIMETERS

CASE CODE	STYLE 1 STYLE 7 D ±0.4	STYLE 1 STYLE 7 L ±1.6	OVERALL LENGTH H MAX.	LEAD SPACING* S ±0.4	TYPICAL WEIGHT (grams)
GE	19.6	29.2	31.6	6.4	13
GJ	19.6	41.9	44.3	6.4	18
GL	19.6	54.6	57.0	6.4	23
GP	19.6	67.3	69.7	6.4	28
GS	19.6	80.0	82.4	6.4	33
GT	19.6	92.7	95.1	6.4	38
HE	22.7	29.2	31.6	7.6	18
HJ	22.7	41.9	44.3	7.6	25
HL	22.7	54.6	57.0	7.6	31
HP	22.7	67.3	69.7	7.6	38
HS	22.7	80.0	82.4	7.6	45
HT	22.7	92.7	95.1	7.6	52
JE	25.9	29.2	31.6	10.2	23
JJ	25.9	41.9	44.3	10.2	32
JL	25.9	54.6	57.0	10.2	41
JP	25.9	67.3	69.7	10.2	50
JS	25.9	80.0	82.4	10.2	59
JT	25.9	92.7	95.1	10.2	68

STANDARD RATINGS

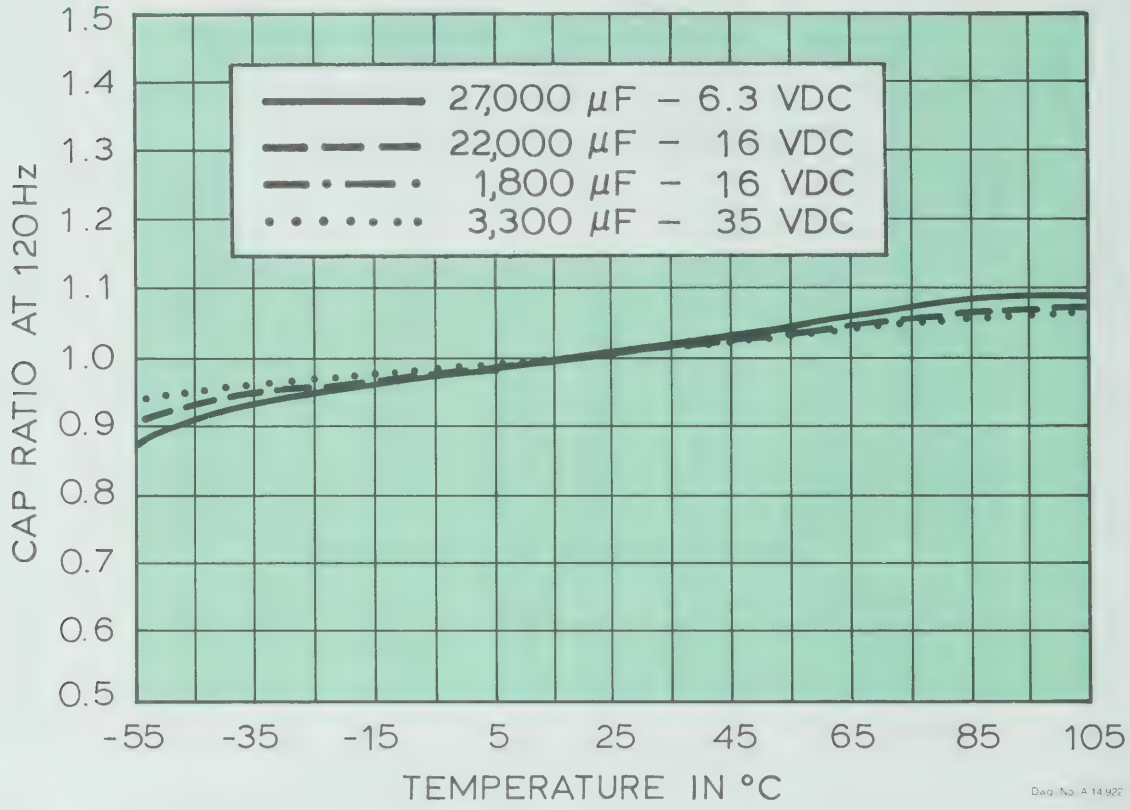
µF	Catalog Number	Nominal Case Size (inches) D ±0.015	x	L ±0.062	ESR @ +25°C (mΩ) 120Hz Max.	ESR @ +25°C (mΩ) 20K-100kHz ±30%	Max. Ripple Current +85°C (A) 120Hz	Max. Ripple Current +85°C (A) 20-100kHz	Max. Impedance @ +25°C (mΩ) 100kHz
6.3 VOLTS DC WORKING; 8 VOLTS DC SURGE									
3,300	767D332M6R3GE1C	0.770	x	1.150	68.0	29.0	3.04	4.10	37
3,900	767D392M6R3GJ1C	0.770	x	1.650	58.0	22.0	3.82	5.43	29
6,800	767D682M6R3GJ1C	0.770	x	1.650	44.0	19.0	4.38	5.85	26
10,000	767D103M6R3GL1C	0.770	x	2.150	31.0	13.0	5.83	7.87	19
12,000	767D123M6R3GP1C	0.770	x	2.650	22.0	11.0	7.59	9.41	16
18,000	767D183M6R3GS1C	0.770	x	3.150	19.0	9.4	8.81	10.97	13
4,700	767D472M6R3HE1C	0.895	x	1.150	45.0	21.0	4.13	5.31	27
5,600	767D562M6R3HJ1C	0.895	x	1.650	39.0	15.0	5.10	7.21	22
8,200	767D822M6R3HJ1C	0.895	x	1.650	35.0	13.0	5.38	7.65	19
10,000	767D103M6R3HJ1C	0.895	x	1.650	28.0	12.0	6.02	8.10	17
15,000	767D153M6R3HL1C	0.895	x	2.150	20.0	8.8	8.06	10.48	12
22,000	767D223M6R3HP1C	0.895	x	2.650	15.0	6.9	10.03	12.96	10
27,000	767D273M6R3HS1C	0.895	x	3.150	11.0	6.0	12.65	15.20	9
6,800	767D682M6R3JE1C	1.020	x	1.150	30.0	15.0	5.52	7.11	21
15,000	767D153M6R3JJ1C	1.020	x	1.650	17.0	9.0	8.39	10.12	14
18,000	767D183M6R3JL1C	1.020	x	2.150	16.0	8.0	9.60	11.92	12
22,000	767D223M6R3JL1C	1.020	x	2.150	15.0	7.0	9.91	12.73	11
27,000	767D273M6R3JP1C	1.020	x	2.650	11.0	5.7	12.65	15.12	9
33,000	767D333M6R3JS1C	1.020	x	3.150	10.0	5.0	14.31	17.65	8
39,000	767D393M6R3JT1C	1.020	x	3.650	8.7	4.2	16.37	20.59	8
10 VOLTS DC WORKING; 13 VOLTS DC SURGE									
2,700	767D272M010GE1C	0.770	x	1.150	79.0	29.0	2.84	4.10	37
5,600	767D562M010GJ1C	0.770	x	1.650	45.0	19.0	4.38	5.85	26
8,200	767D822M010GL1C	0.770	x	2.150	33.0	13.0	5.66	7.87	19
10,000	767D103M010GP1C	0.770	x	2.650	22.0	11.0	7.59	9.41	16
12,000	767D123M010GS1C	0.770	x	3.150	20.0	9.4	8.58	10.97	13
3,300	767D332M010HE1C	0.895	x	1.150	45.0	21.0	4.13	5.31	27
3,900	767D392M010HJ1C	0.895	x	1.650	43.0	15.0	4.86	7.21	22
4,700	767D472M010HJ1C	0.895	x	1.650	41.0	13.0	4.97	7.65	19
6,800	767D682M010HJ1C	0.895	x	1.650	27.0	12.0	6.12	8.10	17
8,200	767D822M010HL1C	0.895	x	2.150	23.0	9.8	7.40	9.98	15
10,000	767D103M010HL1C	0.895	x	2.150	18.0	8.8	8.37	10.48	12
12,000	767D123M010HP1C	0.895	x	2.650	15.0	6.9	10.05	12.96	10
15,000	767D153M010HS1C	0.895	x	3.150	12.0	6.0	12.13	15.02	9
5,600	767D562M010JE1C	1.020	x	1.150	39.0	15.0	4.86	7.11	21
10,000	767D103M010JJ1C	1.020	x	1.650	24.0	9.0	7.06	10.12	14
15,000	767D153M010JL1C	1.020	x	2.150	17.0	7.0	9.32	12.73	11
18,000	767D183M010JP1C	1.020	x	2.650	15.0	6.5	10.83	14.43	10
22,000	767D223M010JP1C	1.020	x	2.650	12.0	5.9	12.13	15.12	9
27,000	767D273M010JS1C	1.020	x	3.150	11.0	5.0	13.63	17.65	8
33,000	767D333M010JT1C	1.020	x	3.650	9.2	4.2	15.93	20.59	8
16 VOLTS DC WORKING; 20 VOLTS DC SURGE									
1,800	767D182M016GE1C	0.770	x	1.150	97.0	32.0	2.56	4.17	39
2,200	767D222M016GJ1C	0.770	x	1.650	78.0	23.0	3.29	5.33	30
3,300	767D332M016GJ1C	0.770	x	1.650	64.0	21.0	3.65	5.55	29
3,900	767D392M016GJ1C	0.770	x	1.650	53.0	19.0	4.00	5.85	26
5,600	767D562M016GL1C	0.770	x	2.150	37.0	13.0	5.33	7.87	19
8,200	767D822M016GP1C	0.770	x	2.650	28.0	11.0	6.73	9.41	16
10,000	767D103M016GS1C	0.770	x	3.150	24.0	9.4	7.84	10.97	13

STANDARD RATINGS

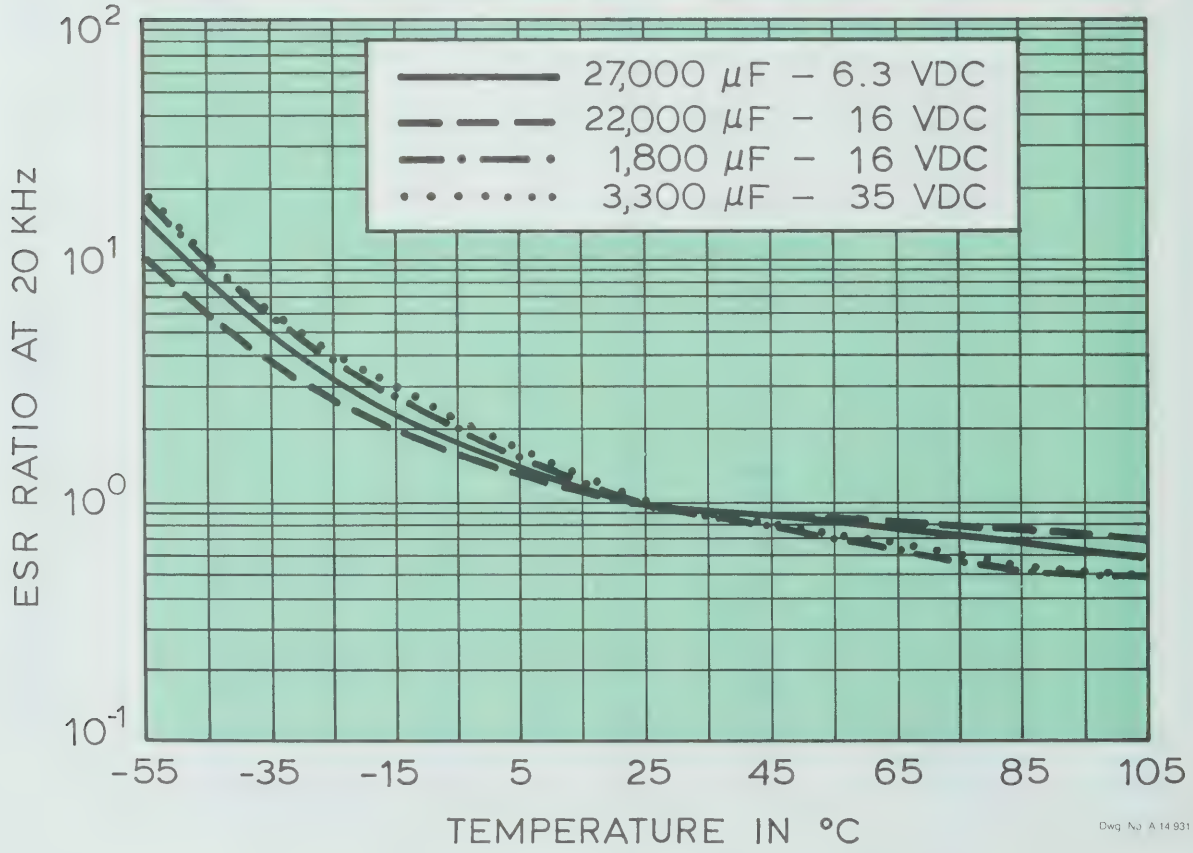
µF	Catalog Number	Nominal Case Size (inches) D ±0.015	x	L ±0.062	ESR @ +25°C (mΩ) 120Hz Max.	ESR @ +25°C (mΩ) 20K-100kHz ±30%	Max. Ripple Current +85°C (A) 120Hz	Max. Ripple Current +85°C (A) 20-100kHz	Max. Impedance @ +25°C (mΩ) 100kHz
16 VOLTS DC WORKING; 20 VOLTS DC SURGE (Cont.)									
2,700	767D272M016HE1C	0.895	x	1.150	67	21.0	3.39	5.31	27
4,700	767D472M016HJ1C	0.895	x	1.650	42	13.0	4.91	7.65	19
5,600	767D562M016HJ1C	0.895	x	1.650	34	12.0	5.47	8.10	17
6,800	767D682M016HL1C	0.895	x	2.150	29	9.8	6.59	9.98	15
8,200	767D822M016HL1C	0.895	x	2.150	23	8.8	7.46	10.48	12
12,000	767D123M016HP1C	0.895	x	2.650	18	6.9	9.15	12.96	10
15,000	767D153M016HS1C	0.895	x	3.150	15	6.0	10.83	15.02	9
3,900	767D392M016JE1C	1.020	x	1.150	51	15.0	4.22	7.11	21
8,200	767D822M016JJ1C	1.020	x	1.650	26	9.0	6.78	10.12	14
12,000	767D123M016JL1C	1.020	x	2.150	18	7.0	9.05	12.73	11
15,000	767D153M016JP1C	1.020	x	2.650	14	5.9	11.21	15.12	9
18,000	767D183M016JS1C	1.020	x	3.150	12	5.0	13.04	17.65	8
22,000	767D223M016JT1C	1.020	x	3.650	10	4.2	15.28	20.59	8
25 VOLTS DC WORKING; 32 VOLTS DC SURGE									
1,200	767D122M025GE1C	0.770	x	1.150	114	32.0	2.37	4.17	39
1,500	767D152M025GJ1C	0.770	x	1.650	85	22.0	3.15	5.43	29
2,200	767D222M025GJ1C	0.770	x	1.650	58	19.0	3.82	5.85	26
3,900	767D392M025GL1C	0.770	x	2.150	40	13.0	5.14	7.87	19
4,700	767D472M025GP1C	0.770	x	2.650	31	11.0	6.49	9.41	16
5,600	767D562M025GS1C	0.770	x	3.150	26	9.4	7.53	10.97	13
1,800	767D182M025HE1C	0.895	x	1.150	74	21.0	3.22	5.31	27
3,300	767D332M025HJ1C	0.895	x	1.650	44	13.0	4.79	7.65	19
3,900	767D392M025HJ1C	0.895	x	1.650	37	12.0	5.24	8.10	17
5,600	767D562M025HL1C	0.895	x	2.150	25	8.8	7.11	10.48	12
6,800	767D682M025HP1C	0.895	x	2.650	20	6.9	8.68	12.96	10
8,200	767D822M025HS1C	0.895	x	3.150	16	6.0	10.48	15.02	9
2,700	767D272M025JE1C	1.020	x	1.150	55	15.0	4.07	7.11	21
4,700	767D472M025JJ1C	1.020	x	1.650	28	9.0	6.54	10.12	14
6,800	767D682M025JL1C	1.020	x	2.150	20	7.0	8.58	12.73	11
10,000	767D103M025JP1C	1.020	x	2.650	16	5.9	10.48	15.12	9
12,000	767D123M025JS1C	1.020	x	3.150	13	5.0	12.54	17.65	8
15,000	767D153M025JT1C	1.020	x	3.650	10	4.2	15.28	20.59	8
35 VOLTS DC WORKING; 44 VOLTS DC SURGE									
820	767D821M035GE1C	0.770	x	1.150	130	32.0	2.21	4.17	39
1,000	767D102M035GJ1C	0.770	x	1.650	105	22.0	2.84	5.43	29
1,500	767D152M035GJ1C	0.770	x	1.650	70	19.0	3.48	5.85	26
2,200	767D222M035GL1C	0.770	x	2.150	48	13.0	4.69	7.87	19
3,300	767D332M035GP1C	0.770	x	2.650	37	11.0	5.85	9.41	16
3,900	767D392M035GS1C	0.770	x	3.150	30	9.4	7.01	10.97	13
1,200	767D122M035HE1C	0.895	x	1.150	90	21.0	2.92	5.31	27
2,200	767D222M035HJ1C	0.895	x	1.650	45	12.0	4.74	8.10	17
2,700	767D272M035HL1C	0.895	x	2.150	38	10.0	5.81	9.76	15
3,300	767D332M035HL1C	0.895	x	2.150	31	8.8	6.38	10.48	12
4,700	767D472M035HP1C	0.895	x	2.650	24	6.9	7.92	12.96	10
5,600	767D562M035HS1C	0.895	x	3.150	19	6.0	9.62	15.02	9
1,800	767D182M035JE1C	1.020	x	1.150	67	15.0	3.68	7.11	21
3,300	767D332M035JJ1C	1.020	x	1.650	34	9.0	5.93	10.12	14
4,700	767D472M035JL1C	1.020	x	2.150	23	7.0	8.01	12.73	11
6,800	767D682M035JP1C	1.020	x	2.650	18	5.9	9.90	15.12	9
8,200	767D822M035JS1C	1.020	x	3.150	15	5.0	11.68	17.65	8
10,000	767D103M035JT1C	1.020	x	3.650	13	4.2	13.39	20.59	8

TYPICAL CURVES

TYPE 767D - TYPICAL CAP VS. TEMP. AT 120HZ

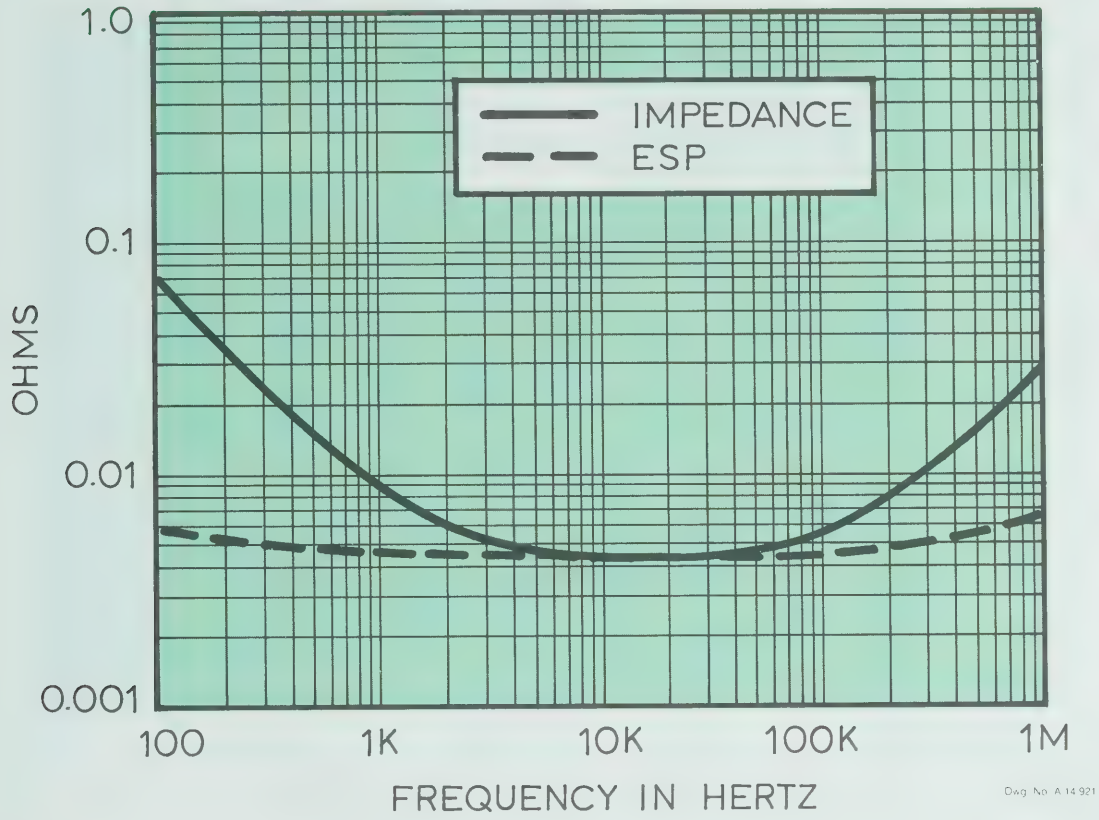


TYPE 767D - TYPICAL ESR VS. TEMP. AT 20KHZ

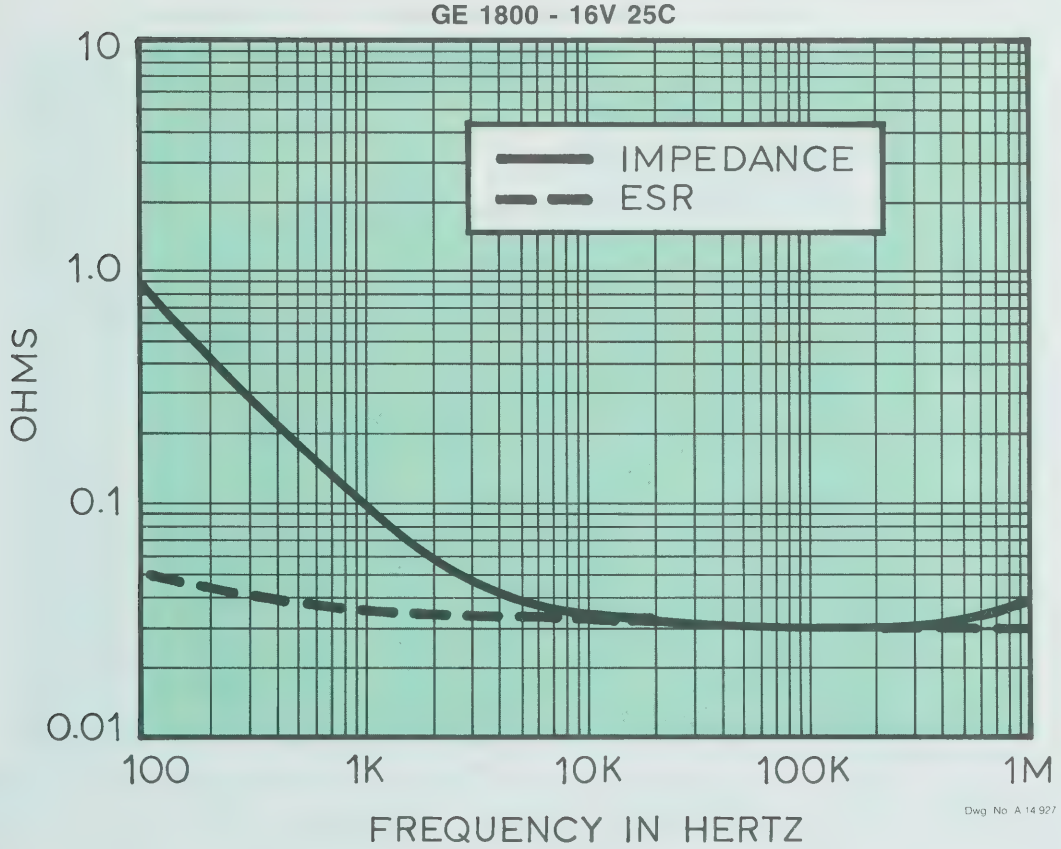


TYPICAL CURVES OF IMPEDANCE AS A FUNCTION OF FREQUENCY

JP 27000 - 6.3V 25C

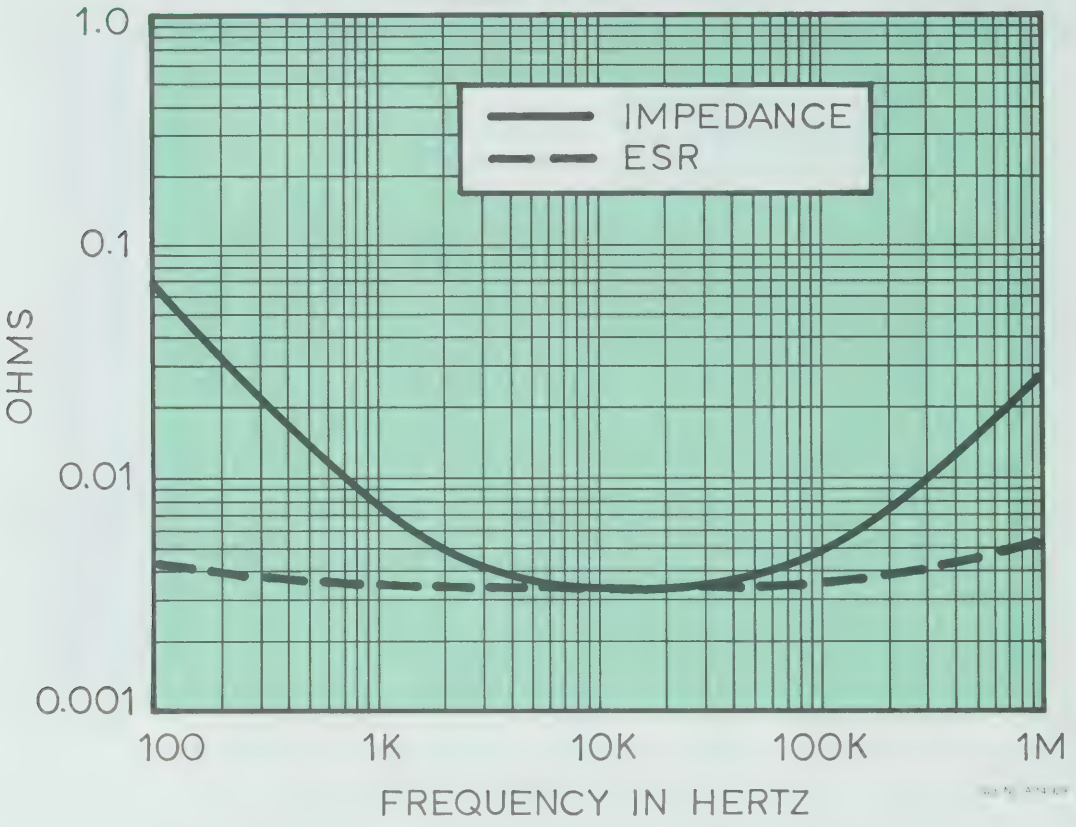


GE 1800 - 16V 25C

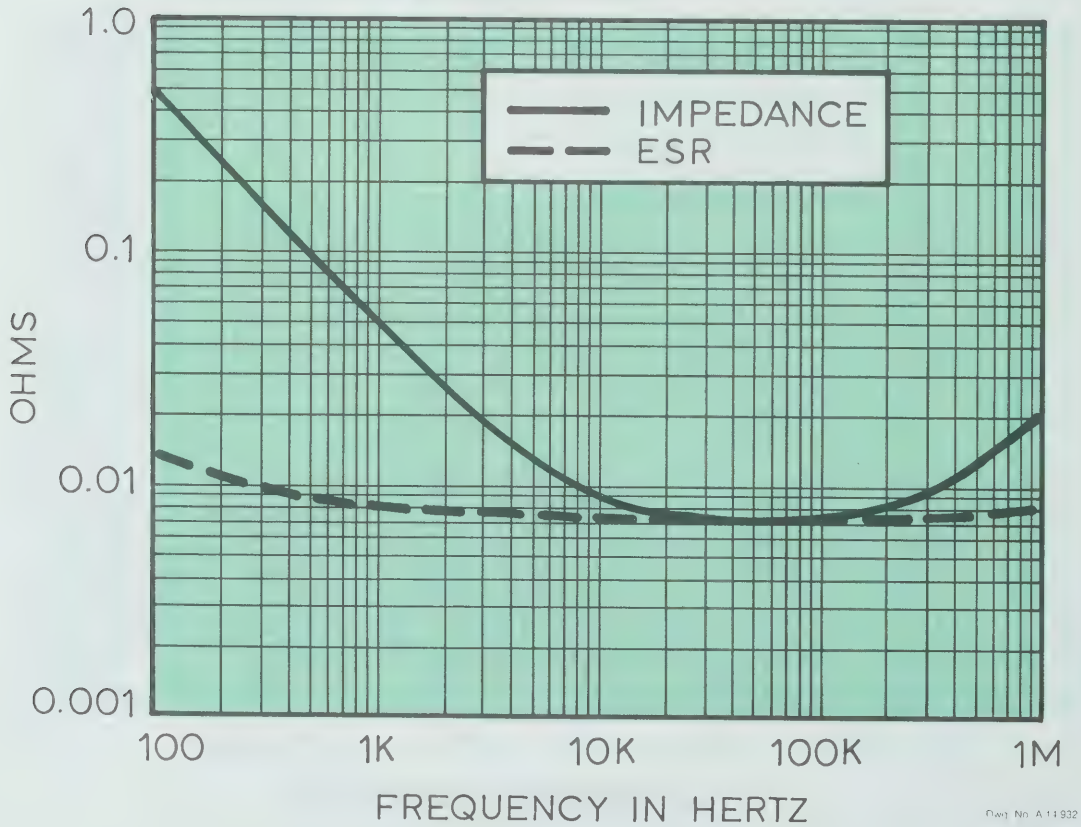


TYPICAL CURVES

JT 22000 - 16V 25C

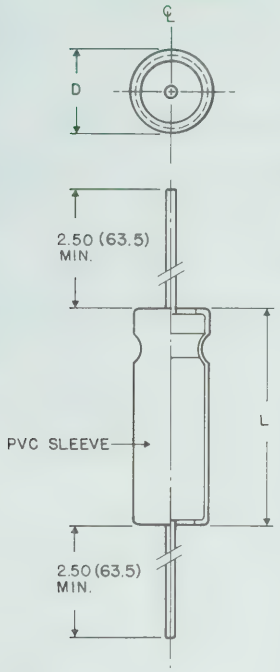


HL 3300 - 35V 25C



OUTLINE DRAWINGS

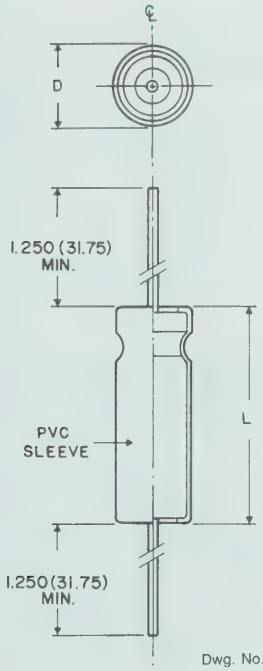
TYPE 53D



Dwg. No. A-14,835

TINNED COPPER LEADS $\frac{0.040}{1.016}$ Diameter (No. 18 AWG)

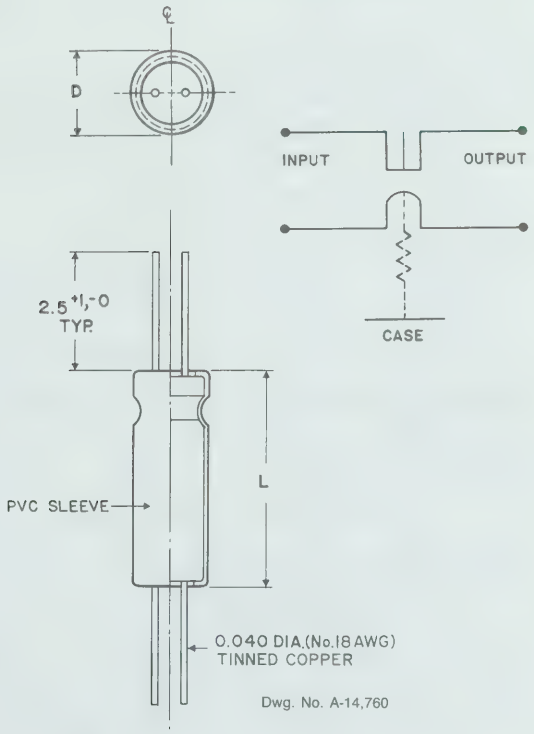
TYPE 601D



Dwg. No. A-14,837

TINNED COPPER LEADS
$\frac{0.032}{0.81}$ Diameter (No. 20 AWG) — Case Diameter F

TYPE 604D



Dwg. No. A-14,760

$\frac{0.040}{1.016}$ Diameter (No. 18 AWG) — Case Diameter G, H, J

+85°C General Purpose Tubular Axial Lead Aluminum Capacitors

L65-09

Features —

- General Purpose Capacitor
- Rugged Construction
- Highest Capacitance Ratings in Axial Leaded Capacitor

General Specifications —

Operating Temperature: −40°C to +85°C.

Voltage Range: 6.3 - 450 VDC.

Capacitance Range: 15μF - 220,000μF.

Capacitance Tolerance: −10%, +50%.

Case Size Range: 0.75″ x 1.125″ - 1.375″ x 4.125″.

Termination: Axial leads.

Life Validation Test: 1000 hrs @ +85°C:
Δ CAP ≤ 15% from initial measurement.
Δ ESR ≤ 1.5x initial specified limit.
Δ DCL ≤ initial specified limit.

Shelf Test: 500 hrs @ +85°C:
Δ CAP ≤ 10% from initial measurement.
Δ ESR ≤ 1.3x initial specified limit.
Δ DCL ≤ 2.0x initial specified limit.

DC Leakage Current: 5 min. charge time.
$I = K\sqrt{CV}$
K = 6.0 @ +25°C; 36 @ +85°C
I in μA, C in μF, V in Volts

Ripple Current Multipliers:

TEMPERATURE

Ambient Temp.	Multipliers
+85°C	1.0
+75°C	1.4
+65°C	1.7
+45°C & below	2.0

FREQUENCY Hz

Rated WVDC	50-60	300-400	1000 and up
0-50	0.85	1.10	1.15
51-299	0.85	1.15	1.20
300-up	0.80	1.30	1.40

Low Temperature Performance:

Capacitance Ratio $C_{-40°C}/C_{+25°C}$ min. @ 120Hz

Rated Voltage (VDC)	Capacitance Remaining
0 to 40	35
41 to 63	45
64 to 100	60
101 to 350	20
351 to 450	15

ESR Ratio $ESR_{-40°C}/ESR_{+25°C}$ max. @ 120Hz

Rated Voltage (VDC)	Multiplier
0 to 40	60
41 to 63	55
64 to 100	65
101 to 350	180
351 to 450	190

Performance Characteristics —

SEE PAGE 2.

Catalog Numbering System

53D 562 F 6R3 GE 6

STYLE NUMBER.
6 = PVC SLEEVE (Standard).
7 = PVC SLEEVE WITH RESIN END SEAL.
(Recommended for exposure to halogenated cleaning solvents).

CASE CODE. SEE DIMENSIONS, BELOW.

DC VOLTAGE RATING. EXPRESSED IN VOLTS. 'R' SIGNIFIES A DECIMAL POINT, FOR EXAMPLE, 6R3 = 6.3 VOLTS.

CAPACITANCE TOLERANCE. F = −10, +50%.

CAPACITANCE. EXPRESSED IN MICROFARADS. THE FIRST TWO DIGITS ARE SIGNIFICANT FIGURES. THE THIRD IS THE NUMBER OF ZEROS.

TYPE NUMBER. IDENTIFIES THE BASIC CAPACITOR DESIGN.

DIMENSIONS IN INCHES

Case Code	STYLE 6 STYLE 7 D ±0.020	STYLE 6 STYLE 7 L ±0.062	Typical Weight (Oz.)
GE	0.760	1.141	0.46
GJ	0.760	1.641	0.63
GL	0.760	2.141	0.81
GP	0.760	2.641	0.98
GS	0.760	3.141	1.16
GT	0.760	3.641	1.34
HE	0.885	1.141	0.63
HJ	0.885	1.641	0.88
HL	0.885	2.141	1.09
HP	0.885	2.641	1.34
HS	0.885	3.141	1.58
HT	0.885	3.641	1.83
JE	1.010	1.141	0.81
JJ	1.010	1.641	1.12
JL	1.010	2.141	1.44
JP	1.010	2.641	1.76
JS	1.010	3.141	2.08
JT	1.010	3.641	2.39
KE	1.135	1.141	1.02
KJ	1.135	1.641	1.41
KL	1.135	2.141	1.80
KP	1.135	2.641	2.18
KS	1.135	3.141	2.61
KT	1.135	3.641	3.00
KD	1.135	4.141	3.38
LE	1.260	1.141	1.26
LJ	1.260	1.641	1.76
LL	1.260	2.141	2.23
LP	1.260	2.641	2.75
LS	1.260	3.141	3.24
LT	1.260	3.641	3.70
LD	1.260	4.141	4.19
ME	1.375	1.141	1.51
MJ	1.375	1.641	2.11
ML	1.375	2.141	2.71
MP	1.375	2.641	3.31
MS	1.375	3.141	3.91
MT	1.375	3.641	4.51
MD	1.375	4.141	5.07

DIMENSIONS IN MILLIMETERS

Case Code	STYLE 6 STYLE 7 D ±0.51	STYLE 6 STYLE 7 L ±1.58	Typical Weight (Grams)
GE	19.3	29.0	13
GJ	19.3	41.7	18
GL	19.3	54.4	23
GP	19.3	67.1	28
GS	19.3	79.8	33
GT	19.3	92.5	38
HE	22.5	29.0	18
HJ	22.5	41.7	25
HL	22.5	54.4	31
HP	22.5	67.1	38
HS	22.5	79.8	45
HT	22.5	92.5	52
JE	25.7	29.0	23
JJ	25.7	41.7	32
JL	25.7	54.4	41
JP	25.7	67.1	50
JS	25.7	79.8	59
JT	25.7	92.5	68
KE	28.8	29.0	29
KJ	28.8	41.7	40
KL	28.8	54.4	51
KP	28.8	67.1	62
KS	28.8	79.8	74
KT	28.8	92.5	85
KD	28.8	105.2	96
LE	32.0	29.0	36
LJ	32.0	41.7	50
LL	32.0	54.4	64
LP	32.0	67.1	78
LS	32.0	79.8	92
LT	32.0	92.5	105
LD	32.0	105.2	119
ME	35.2	29.0	43
MJ	35.2	41.7	60
ML	35.2	54.4	77
MP	35.2	67.1	94
MS	35.2	79.8	111
MT	35.2	92.5	128
MD	35.2	105.2	144

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size (inches) D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-100kHz	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-100kHz
6.3 VOLTS DC WORKING; 8 VOLTS DC SURGE						
5600	53D562F6R3GE6	0.750 x 1.125	108.0	82.0	1.41	1.61
18000	53D183F6R3GJ6	0.750 x 1.625	77.0	58.0	1.92	2.21
33000	53D333F6R3GP6	0.750 x 2.625	42.0	32.0	3.19	3.64
39000	53D393F6R3GS6	0.750 x 3.125	35.0	26.8	3.76	4.30
47000	53D473F6R3GT6	0.750 x 3.625	30.0	22.9	4.34	4.97
8200	53D822F6R3HE6	0.875 x 1.125	80.0	61.0	1.80	2.05
27000	53D273F6R3HJ6	0.875 x 1.625	54.0	41.0	2.51	2.87
47000	53D473F6R3HP6	0.875 x 2.625	31.0	23.9	4.04	4.60
56000	53D563F6R3HS6	0.875 x 3.125	26.0	20.0	4.74	5.39
68000	53D683F6R3HT6	0.875 x 3.625	23.0	17.7	5.42	6.15
12000	53D123F6R3JE6	1.000 x 1.125	69.0	53.5	2.11	2.39
39000	53D393F6R3JJ6	1.000 x 1.625	44.0	33.9	3.03	3.44
68000	53D683F6R3JP6	1.000 x 2.625	26.0	19.9	4.80	5.44
82000	53D823F6R3JS6	1.000 x 3.125	22.0	17.1	5.61	6.32
100000	53D104F6R3JT6	1.000 x 3.625	20.0	15.6	6.27	7.06
15000	53D153F6R3KE6	1.125 x 1.125	62.0	48.4	2.41	2.72
47000	53D473F6R3KJ6	1.125 x 1.625	39.0	30.5	3.45	3.90
82000	53D823F6R3KP6	1.125 x 2.625	23.0	18.1	5.41	6.11
100000	53D104F6R3KS6	1.125 x 3.125	20.0	15.8	6.24	7.04
120000	53D124F6R3KT6	1.125 x 3.625	18.0	14.0	7.08	7.96
150000	53D154F6R3KD6	1.125 x 4.125	16.0	12.8	7.86	8.81
22000	53D223F6R3ME6	1.375 x 1.125	67.0	54.5	2.65	2.94
68000	53D683F6R3MJ6	1.375 x 1.625	37.0	30.0	4.02	4.46
120000	53D124F6R3MP6	1.375 x 2.625	22.0	18.0	6.23	6.91
150000	53D154F6R3MS6	1.375 x 3.125	18.8	15.4	7.25	8.01
180000	53D184F6R3MT6	1.375 x 3.625	16.7	13.7	8.18	9.03
220000	53D224F6R3MD6	1.375 x 4.125	15.2	12.4	9.06	10.00
10 VOLTS DC WORKING, 12 VOLTS DC SURGE						
4700	53D472F010GE6	0.750 x 1.125	115.0	85.0	1.36	1.57
12000	53D123F010GJ6	0.750 x 1.625	85.0	63.0	1.83	2.12
27000	53D273F010GP6	0.750 x 2.625	45.0	33.8	3.07	3.54
33000	53D333F010GS6	0.750 x 3.125	38.0	28.2	3.63	4.19
39000	53D393F010GT6	0.750 x 3.625	32.5	24.4	4.17	4.82
6800	53D682F010HE6	0.875 x 1.125	85.0	63.0	1.74	2.02
18000	53D183F010HJ6	0.875 x 1.625	60.0	44.9	2.39	2.75
39000	53D393F010HP6	0.875 x 2.625	33.2	25.0	3.90	4.49
47000	53D473F010HS6	0.875 x 3.125	28.0	21.3	4.58	5.25
56000	53D563F010HT6	0.875 x 3.625	24.4	18.6	5.24	6.00
10000	53D103F010JE6	1.000 x 1.125	72.0	55.0	2.05	2.36
27000	53D273F010JJ6	1.000 x 1.625	47.3	36.0	2.91	3.34
47000	53D473F010JP6	1.000 x 2.625	27.0	20.8	4.66	5.32
68000	53D683F010JS6	1.000 x 3.125	22.9	17.7	5.46	6.21
82000	53D823F010JT6	1.000 x 3.625	20.2	15.6	6.21	7.06
12000	53D123F010KE6	1.125 x 1.125	64.0	49.7	2.36	2.68
33000	53D333F010KJ6	1.125 x 1.625	41.0	31.6	3.36	3.83
68000	53D683F010KP6	1.125 x 2.625	24.2	18.7	5.29	6.01
82000	53D823F010KS6	1.125 x 3.125	20.6	16.0	6.16	6.99
100000	53D104F010KT6	1.125 x 3.625	18.2	14.2	6.99	7.91
120000	53D124F010KD6	1.125 x 4.125	16.8	13.1	7.69	8.71

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size (inches) D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-100kHz	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-100kHz
10 VOLTS DC WORKING; 12 VOLTS DC SURGE (Cont.)						
18000	53D183F010ME6	1.375 x 1.125	67.0	53.0	2.64	2.94
56000	53D563F010MJ6	1.375 x 1.625	3.8	30.0	4.00	4.46
100000	53D104F010MP6	1.375 x 2.625	22.2	18.0	6.22	6.91
120000	53D124F010MS6	1.375 x 3.125	19.1	15.4	7.19	8.01
150000	53D154F010MT6	1.375 x 3.625	16.8	13.7	8.16	9.03
180000	53D184F010MD6	1.375 x 4.125	15.3	12.4	9.03	10.0
16 VOLTS DC WORKING, 18 VOLTS DC SURGE						
3900	53D392F016GE6	0.750 x 1.125	119.0	85.0	1.33	1.58
10000	53D103F016GJ6	0.750 x 1.625	82.0	59.0	1.86	2.19
18000	53D183F016GP6	0.750 x 2.625	46.0	33.0	3.04	3.57
22000	53D223F016GS6	0.750 x 3.125	38.0	28.0	3.59	4.21
27000	53D273F016GT6	0.750 x 3.625	33.3	24.3	4.12	4.82
5600	53D562F016HE6	0.875 x 1.125	88.0	64.0	1.71	2.00
15000	53D153F016HJ6	0.875 x 1.625	61.0	43.9	2.37	2.78
27000	53D273F016HP6	0.875 x 2.625	33.8	24.8	3.87	4.51
33000	53D333F016HS6	0.875 x 3.125	28.6	21.1	4.53	5.27
39000	53D393F016HT6	0.875 x 3.625	24.6	18.3	5.22	6.05
8200	53D822F016JE6	1.000 x 1.125	72.0	53.2	2.07	2.40
18000	53D183F016JJ6	1.000 x 1.625	47.5	34.9	2.91	3.39
39000	53D393F016JP6	1.000 x 2.625	27.3	20.4	4.65	5.37
47000	53D473F016JS6	1.000 x 3.125	23.2	17.4	5.43	6.27
56000	53D563F016JT6	1.000 x 3.625	20.3	15.4	6.19	7.11
10000	53D103F016KE6	1.125 x 1.125	64.9	48.9	2.35	2.71
22000	53D223F016KJ6	1.125 x 1.625	41.8	31.2	3.33	3.86
47000	53D473F016KP6	1.125 x 2.625	24.4	18.4	5.26	6.06
56000	53D563F016KS6	1.125 x 3.125	20.8	15.8	6.13	7.04
68000	53D683F016KT6	1.125 x 3.625	18.4	14.0	6.95	7.96
82000	53D823F016KD6	1.125 x 4.125	16.6	12.8	7.74	8.81
15000	53D153F016ME6	1.375 x 1.125	68.3	54.5	2.62	2.94
39000	53D393F016MJ6	1.375 x 1.625	38.0	30.1	3.97	4.46
68000	53D683F016MP6	1.375 x 2.625	22.5	18.0	6.18	6.91
82000	53D823F016MS6	1.375 x 3.125	19.2	15.4	7.17	8.01
100000	53D104F016MT6	1.375 x 3.625	17.1	13.7	8.09	9.03
120000	53D124F016MD6	1.375 x 4.125	15.4	12.4	9.00	10.0
25 VOLTS DC WORKING, 35 VOLTS DC SURGE						
1800	53D182F025GE6	0.750 x 1.125	141.0	91.0	1.23	1.52
3900	53D392F025GJ6	0.750 x 1.625	81.0	53.0	1.86	2.30
6800	53D682F025GP6	0.750 x 2.625	44.0	29.0	3.08	3.77
8200	53D822F025GS6	0.750 x 3.125	37.0	25.0	3.63	4.44
10000	53D103F025GT6	0.750 x 3.625	32.0	22.0	4.18	5.09
2700	53D272F025HE6	0.875 x 1.125	101.0	67.0	1.59	1.96
5600	53D562F025HJ6	0.875 x 1.625	59.0	40.0	2.39	2.92
10000	53D103F025HP6	0.875 x 2.625	33.0	22.0	3.83	4.71
12000	53D123F025HS6	0.875 x 3.125	28.0	19.0	4.53	5.46
15000	53D153F025HT6	0.875 x 3.625	25.0	17.0	5.16	6.19
3900	53D392F025JE6	1.000 x 1.125	81.0	55.0	1.93	2.35
8200	53D822F025JJ6	1.000 x 1.625	48.0	32.0	2.87	3.49
15000	53D153F025JP6	1.000 x 2.625	28.0	19.0	4.55	5.44
18000	53D183F025JS6	1.000 x 3.125	23.0	16.0	5.42	6.44
22000	53D223F025JT6	1.000 x 3.625	20.0	14.0	6.14	7.30

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size (inches) D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-100kHz	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-100kHz
25 VOLTS DC WORKING; 35 VOLTS DC SURGE (Cont.)						
4700	53D472F025KE6	1.125 x 1.125	72.0	50.0	2.23	2.67
10000	53D103F025KJ6	1.125 x 1.625	42.0	29.0	3.31	3.95
18000	53D183F025KP6	1.125 x 2.625	25.0	17.0	5.19	6.15
22000	53D223F025KS6	1.125 x 3.125	21.0	15.0	6.06	7.13
27000	53D273F025KT6	1.125 x 3.625	18.0	13.0	6.89	8.08
33000	53D333F025KD6	1.125 x 4.125	16.0	12.0	7.67	8.95
6800	53D682F025ME6	1.375 x 1.125	71.0	55.0	2.56	2.92
15000	53D153F025MJ6	1.375 x 1.625	41.0	32.0	3.80	4.32
27000	53D273F025MP6	1.375 x 2.625	24.0	19.0	5.94	6.72
33000	53D333F025MS6	1.375 x 3.125	20.0	16.0	6.89	7.81
39000	53D393F025MT6	1.375 x 3.625	18.0	14.0	7.82	8.84
47000	53D473F025MD6	1.375 x 4.125	16.0	13.0	8.67	9.76
35 VOLTS DC WORKING, 45 VOLTS DC SURGE						
1500	53D152F035GE6	0.750 x 1.125	152.0	92.0	1.18	1.52
2700	53D272F035GJ6	0.750 x 1.625	86.0	53.0	1.80	2.31
5600	53D562F035GP6	0.750 x 2.625	48.0	30.0	2.97	3.76
6800	53D682F035GS6	0.750 x 3.125	40.0	25.0	3.52	4.44
8200	53D822F035GT6	0.750 x 3.625	34.0	21.0	4.07	5.11
2200	53D222F035HE6	0.875 x 1.125	109.0	67.0	1.54	1.95
3900	53D392F035HJ6	0.875 x 1.625	63.0	39.0	2.32	2.93
6800	53D682F035HP6	0.875 x 2.625	35.0	22.0	3.78	4.72
10000	53D103F035HS6	0.875 x 3.125	29.0	19.0	4.45	5.52
12000	53D123F035HT6	0.875 x 3.625	26.0	17.0	5.06	6.24
3300	53D332F035JE6	1.000 x 1.125	87.0	55.0	1.87	2.34
5600	53D562F035JJ6	1.000 x 1.625	50.0	32.0	2.82	3.50
10000	53D103F035JP6	1.000 x 2.625	30.0	19.0	4.43	5.45
12000	53D123F035JS6	1.000 x 3.125	24.0	16.0	5.27	6.44
15000	53D153F035JT6	1.000 x 3.625	21.0	14.0	5.97	7.22
3900	53D392F035KE6	1.125 x 1.125	76.0	50.0	2.17	2.67
6800	53D682F035KJ6	1.125 x 1.625	44.0	29.0	3.23	3.95
12000	53D123F035KP6	1.125 x 2.625	26.0	17.0	5.08	6.15
15000	53D153F035KS6	1.125 x 3.125	22.0	15.0	5.92	7.13
18000	53D183F035KT6	1.125 x 3.625	19.0	13.0	6.73	8.05
22000	53D223F035KD6	1.125 x 4.125	17.0	12.0	7.49	8.95
5600	53D562F035ME6	1.375 x 1.125	73.0	55.0	2.52	2.92
10000	53D103F035MJ6	1.375 x 1.625	42.0	32.0	3.75	4.32
18000	53D183F035MP6	1.375 x 2.625	25.0	19.0	5.86	6.72
22000	53D223F035MS6	1.375 x 3.125	21.0	16.0	6.83	7.81
27000	53D273F035MT6	1.375 x 3.625	18.0	14.0	7.73	8.84
33000	53D333F035MD6	1.375 x 4.125	16.0	13.0	8.61	9.76
50 VOLTS DC WORKING, 70 VOLTS DC SURGE						
1000	53D102F050GE6	0.750 x 1.125	178.0	93.0	1.09	1.51
1800	53D182F050GJ6	0.750 x 1.625	103.0	54.0	1.66	2.28
3300	53D332F050GP6	0.750 x 2.625	55.0	30.0	2.77	3.75
3900	53D392F050GS6	0.750 x 3.125	46.0	25.0	3.26	4.40
4700	53D472F050GT6	0.750 x 3.625	39.0	22.0	3.78	5.06
1500	53D152F050HE6	0.875 x 1.125	133.0	71.0	1.39	1.90
2700	53D272F050HJ6	0.875 x 1.625	72.0	39.0	2.16	2.92
4700	53D472F050HP6	0.875 x 2.625	40.0	23.0	3.53	4.69
5600	53D562F050HS6	0.875 x 3.125	33.0	19.0	4.18	5.49
6800	53D682F050HT6	0.875 x 3.625	29.0	17.0	4.78	6.24

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size (inches) D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-100kHz	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-100kHz
50 VOLTS DC WORKING; 70 VOLTS DC SURGE (Cont.)						
1800	53D182F050JE6	1.000 x 1.125	10.0	56.0	1.75	2.32
3900	53D392F050JJ6	1.000 x 1.625	58.0	33.0	2.62	3.46
6800	53D682F050JP6	1.000 x 2.625	32.0	19.0	4.25	5.50
8200	53D822F050JS6	1.000 x 3.125	27.0	16.0	4.99	6.42
10000	53D103F050JT6	1.000 x 3.625	24.0	14.0	5.69	7.30
2200	53D222F050KE6	1.125 x 1.125	86.0	50.0	2.03	2.65
4700	53D472F050KJ6	1.125 x 1.625	50.0	30.0	3.04	3.93
8200	53D822F050KP6	1.125 x 2.625	28.0	17.0	4.85	6.16
10000	53D103F050KS6	1.125 x 3.125	25.0	15.0	5.59	7.08
12000	53D123F050KT6	1.125 x 3.625	21.0	13.0	6.38	8.02
15000	53D153F050KD6	1.125 x 4.125	19.0	12.0	7.16	8.92
3900	53D392F050ME6	1.375 x 1.125	78.0	55.0	2.46	2.92
6800	53D682F050MJ6	1.375 x 1.625	45.0	32.0	3.64	4.32
12000	53D123F050MP6	1.375 x 2.625	26.0	19.0	5.71	6.70
15000	53D153F050MS6	1.375 x 3.125	22.0	16.0	6.66	7.81
18000	53D183F050MT6	1.375 x 3.625	19.0	14.0	7.55	8.81
22000	53D223F050MD6	1.375 x 4.125	17.0	13.0	8.40	9.76
63 VOLTS DC WORKING, 80 VOLTS DC SURGE						
680	53D681F063GE6	0.750 x 1.125	188.0	106.0	1.23	1.63
1500	53D152F063GJ6	0.750 x 1.625	109.0	53.0	1.61	2.31
2700	53D272F063GP6	0.750 x 2.625	60.0	30.0	2.64	3.74
3300	53D332F063GS6	0.750 x 3.125	50.0	25.0	3.14	4.41
3900	53D392F063GT6	0.750 x 3.625	42.0	21.0	3.66	5.09
1200	53D122F063HE6	0.875 x 1.125	140.0	69.0	1.36	1.93
2200	53D222F063HJ6	0.875 x 1.625	78.0	39.0	2.09	2.94
3900	53D392F063HP6	0.875 x 2.625	44.0	23.0	3.38	4.69
4700	53D472F063HS6	0.875 x 3.125	36.0	19.0	4.03	5.50
5600	53D562F063HT6	0.875 x 3.625	31.0	17.0	4.63	6.26
1500	53D152F063JE6	1.000 x 1.125	110.0	57.0	1.66	2.32
2700	53D272F063JJ6	1.000 x 1.625	63.0	33.0	2.52	3.47
5600	53D562F063JP6	1.000 x 2.625	35.0	19.0	4.09	5.50
6800	53D682F063JS6	1.000 x 3.125	29.0	16.0	4.83	6.42
8200	53D822F063JT6	1.000 x 3.625	25.0	14.0	5.52	7.30
1800	53D182F063KE6	1.125 x 1.125	94.0	51.0	1.95	2.64
3900	53D392F063KJ6	1.125 x 1.625	53.0	29.0	2.94	3.94
6800	53D682F063KP6	1.125 x 2.625	30.0	17.0	4.70	6.16
8200	53D822F063KS6	1.125 x 3.125	25.0	15.0	5.51	7.15
10000	53D103F063KT6	1.125 x 3.625	22.0	13.0	6.25	8.08
12000	53D123F063KD6	1.125 x 4.125	20.0	12.0	6.91	8.92
2700	53D272F063ME6	1.375 x 1.125	81.0	55.0	2.40	2.92
5600	53D562F063MJ6	1.375 x 1.625	47.0	32.0	3.57	4.32
10000	53D103F063MP6	1.375 x 2.625	27.0	19.0	5.62	6.70
12000	53D123F063MS6	1.375 x 3.125	23.0	16.0	6.54	7.81
15000	53D153F063MT6	1.375 x 3.625	20.0	14.0	7.44	8.81
18000	53D183F063MD6	1.375 x 4.125	18.0	13.0	8.28	9.76
100 VOLTS DC WORKING, 135 VOLTS DC SURGE						
270	53D271F100GE6	0.750 x 1.125	452.0	27.0	0.69	1.05
470	53D471F100GJ6	0.750 x 1.625	250.0	107.0	1.06	1.62
1000	53D102F100GP6	0.750 x 2.625	132.0	58.0	1.79	2.70
1200	53D122F100GS6	0.750 x 3.125	112.0	49.0	2.09	3.16
1500	53D152G100GT6	0.750 x 3.625	96.0	42.0	2.43	3.64

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size (inches) D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-100kHz	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-100kHz
100 VOLTS DC WORKING; 135 VOLTS DC SURGE (Cont.)						
390	53D391F100HE6	0.875 x 1.125	312.0	135.0	0.91	1.38
680	53D681F100HJ6	0.875 x 1.625	171.0	75.0	1.41	2.13
1500	53D152F100HP6	0.875 x 2.625	91.0	41.0	2.34	3.49
1800	53D182F100HS6	0.875 x 3.125	76.0	34.0	2.77	4.11
2200	53D222F100HT6	0.875 x 3.625	65.0	30.0	3.19	4.71
560	53D561F100JE6	1.000 x 1.125	235.0	104.0	1.14	1.71
1000	53D102F100JJ6	1.000 x 1.625	131.0	59.0	1.75	2.60
1800	53D182F100JP6	1.000 x 2.625	71.0	33.0	2.88	4.21
2200	53D222F100JS6	1.000 x 3.125	59.0	28.0	3.40	4.93
2700	53D272F100JT6	1.000 x 3.625	49.0	24.0	3.96	5.69
680	53D681F100KE6	1.125 x 1.125	192.0	88.0	1.36	2.01
1200	53D122F100KJ6	1.125 x 1.625	112.0	52.0	2.03	2.98
2200	53D222F100KP6	1.125 x 2.625	59.0	28.0	3.38	4.85
2700	53D272F100KS6	1.125 x 3.125	48.0	23.0	4.02	5.72
3300	53D332F100KT6	1.125 x 3.625	42.0	21.0	4.60	6.49
3900	53D392F100KD6	1.125 x 4.125	36.0	18.0	5.20	7.31
1000	53D102F100ME6	1.375 x 1.125	148.0	73.0	1.78	2.53
1800	53D182F100MJ6	1.375 x 1.625	81.0	41.0	2.71	3.81
3900	53D392F100MP6	1.375 x 2.625	45.0	23.0	4.36	5.99
4700	53D472F100MS6	1.375 x 3.125	37.0	20.0	5.15	7.01
5600	53D562F100MT6	1.375 x 3.625	32.0	17.0	5.88	7.94
6800	53D682F100MD6	1.375 x 4.125	28.0	15.0	6.62	8.89
200 VOLTS DC WORKING, 250 VOLTS DC SURGE						
68	53D680F200GE6	0.750 x 1.125	1661.0	580.0	0.36	0.60
120	53D121F200GJ6	0.750 x 1.625	915.0	321.0	0.56	0.94
220	53D221F200GP6	0.750 x 2.625	454.0	161.0	0.97	1.62
280	53D281F200GS6	0.750 x 3.125	378.0	134.0	1.14	1.92
330	53D331F200GT6	0.750 x 3.625	314.0	112.0	1.34	2.25
100	53D101F200HE6	0.875 x 1.125	1110.0	391.0	0.48	0.81
180	53D181F200HJ6	0.875 x 1.625	579.0	205.0	0.77	1.29
330	53D331F200HP6	0.875 x 2.625	307.0	110.0	1.28	2.14
390	53D391F200HS6	0.875 x 3.125	249.0	90.0	1.53	2.56
470	53D471F200HT6	0.875 x 3.625	210.0	76.0	1.79	2.96
150	53D151F200JE6	1.000 x 1.125	804.0	286.0	0.62	1.03
270	53D271F200JJ6	1.000 x 1.625	426.0	153.0	0.97	1.62
470	53D471F200JP6	1.000 x 2.625	228.0	83.0	1.61	2.66
680	53D681F200JS6	1.000 x 3.125	183.0	67.0	1.93	3.18
820	53D821F200JT6	1.000 x 3.625	154.0	57.0	2.24	3.68
180	53D181F200KE6	1.125 x 1.125	649.0	234.0	0.74	1.24
330	53D331F200KJ6	1.125 x 1.625	338.0	123.0	1.17	1.94
560	53D561F200KP6	1.125 x 2.625	182.0	67.0	1.92	3.16
680	53D681F200KS6	1.125 x 3.125	146.0	55.0	2.31	3.76
1000	53D102F200KT6	1.125 x 3.625	124.0	47.0	2.67	4.34
1200	53D122F200KD6	1.125 x 4.125	107.0	41.0	3.04	4.92
270	53D271F200ME6	1.375 x 1.125	455.0	169.0	1.02	1.66
470	53D471F200MJ6	1.375 x 1.625	234.0	89.0	1.60	2.59
820	53D821F200MP6	1.375 x 2.625	125.0	49.0	2.62	4.19
1000	53D102F200MS6	1.375 x 3.125	101.0	40.0	3.11	4.95
1200	53D122F200MT6	1.375 x 3.625	90.0	36.0	3.51	5.72
1800	53D182F200MD6	1.375 x 4.125	77.0	31.0	4.01	6.32

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size (inches) D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-100kHz	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-100kHz
250 VOLTS DC WORKING, 300 VOLTS DC SURGE						
56	53D560F250GE6	0.750 x 1.125	1959.0	636.0	0.33	0.58
100	53D101F250GJ6	0.750 x 1.625	1015.0	331.0	0.53	0.92
180	53D181F250GP6	0.750 x 2.625	541.0	178.0	0.89	1.54
220	53D221F250GS6	0.750 x 3.125	433.0	143.0	1.07	1.86
270	53D271F250GT6	0.750 x 3.625	361.0	119.0	1.25	2.17
82	53D820F250HE6	0.875 x 1.125	1299.0	425.0	0.45	0.78
150	53D151F250HJ6	0.875 x 1.625	733.0	241.0	0.68	1.19
270	53D271F250HP6	0.875 x 2.625	365.0	121.0	1.18	2.04
330	53D331F250HS6	0.875 x 3.125	292.0	98.0	1.42	2.45
390	53D391F250HT6	0.875 x 3.625	244.0	82.0	1.66	2.85
120	53D121F250JE6	1.000 x 1.125	945.0	312.0	0.57	0.99
220	53D221F250JJ6	1.000 x 1.625	523.0	174.0	0.88	1.52
390	53D391F250JP6	1.000 x 2.625	268.0	90.0	1.48	2.55
470	53D471F250JS6	1.000 x 3.125	216.0	74.0	1.78	3.04
560	53D561F250JT6	1.000 x 3.625	182.0	62.0	2.07	3.53
150	53D151F250KE6	1.125 x 1.125	770.0	47.0	0.68	4.47
270	53D271F250KJ6	1.125 x 1.625	408.0	137.0	1.07	1.83
470	53D471F250KP6	1.125 x 2.625	214.0	73.0	1.78	3.03
560	53D561F250KS6	1.125 x 3.125	170.0	59.0	2.14	3.63
820	53D821F250KT6	1.125 x 3.625	143.0	50.0	2.48	4.19
1000	53D102F250KD6	1.125 x 4.125	124.0	44.0	2.82	4.74
220	53D221F250ME6	1.375 x 1.125	525.0	181.0	0.95	1.61
390	53D391F250MJ6	1.375 x 1.625	272.0	95.0	1.48	2.50
680	53D681F250MP6	1.375 x 2.625	145.0	52.0	2.43	4.09
820	53D821F250MS6	1.375 x 3.125	118.0	43.0	2.89	4.78
1000	53D102F250MT6	1.375 x 3.625	100.0	37.0	3.34	5.50
1500	53D152F250MD6	1.375 x 4.125	94.0	34.0	3.64	6.00
350 VOLTS DC WORKING; 400 VOLTS DC SURGE						
22	53D220F350GE6	0.750 x 1.125	6680.0	3570.0	0.178	0.243
47	53D470F350GJ6	0.750 x 1.625	3390.0	1810.0	0.289	0.395
82	53D820F350GP6	0.750 x 2.625	1710.0	918.0	0.498	0.680
100	53D101F350GS6	0.750 x 3.125	1470.0	787.0	0.581	0.793
120	53D121F350GT6	0.750 x 3.625	1220.0	655.0	0.681	0.930
39	53D390F350HE6	0.875 x 1.125	4180.0	2240.0	0.248	0.340
68	53D680F350HJ6	0.875 x 1.625	2140.0	1150.0	0.399	0.550
120	53D121F350HP6	0 875 x 2.625	1140.0	612.0	0.666	0.910
150	53D151F350HS6	0 875 x 3.125	924.0	497.0	0.797	1.09
180	53D181F350HT6	0 875 x 3.625	777.0	418.0	0.928	1.27
47	53D470F350JE6	1.000 x 1.125	3170.0	1700.0	0.311	0.424
100	53D101F350JJ6	1.000 x 1.625	1600.0	860.0	0.500	0.682
180	53D181F350JP6	1.000 x 2.625	828.0	455.0	0.844	1.15
220	53D221F350JS6	1.000 x 3.125	676.0	364.0	1.00	1.37
270	53D271F350JT6	1.000 x 3.625	571.0	308.0	1.17	1.59
56	53D560F350KE6	1.125 x 1.125	2510.0	1340.0	0.377	0.515
120	53D121F350KJ6	1.125 x 1.625	1260.0	678.0	0.607	0.830
220	53D221F350KP6	1.125 x 2.625	680.0	367.0	1.00	1.36
270	53D271F350KS6	1.125 x 3.125	534.0	288.0	1.21	1.65
330	53D331F350KT6	1.125 x 3.625	453.0	245.0	1.40	1.91
390	53D391F350KD6	1.125 x 4.125	384.0	207.0	1.61	2.19

STANDARD RATINGS

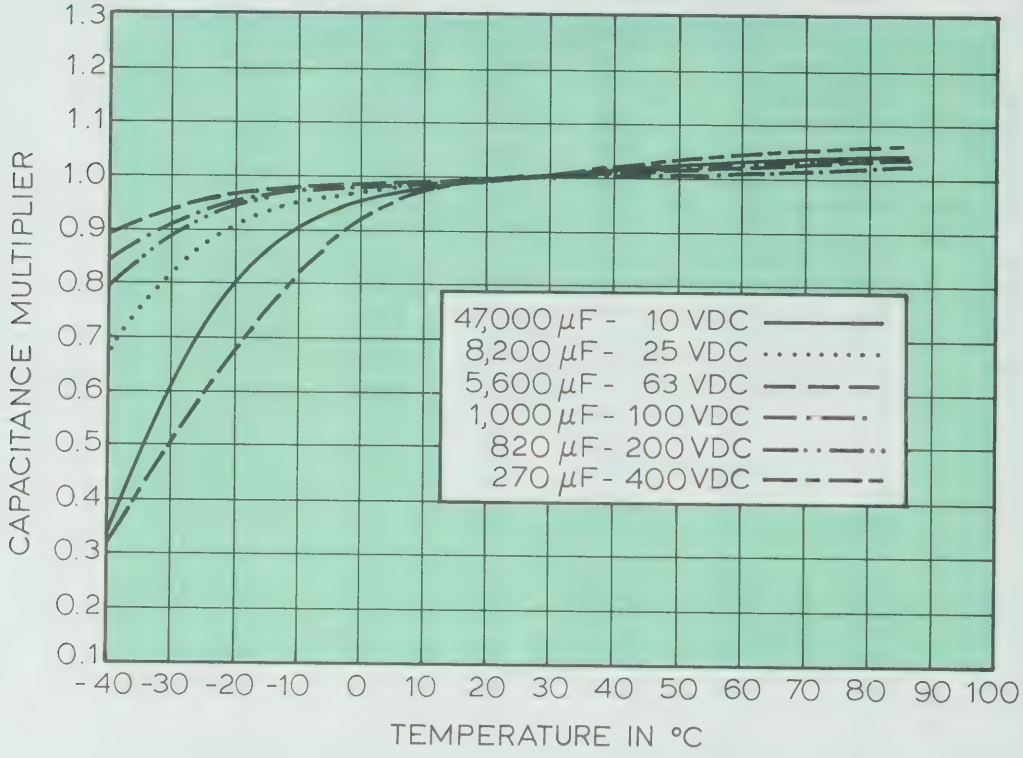
μF	Catalog Number	Nominal Case Size (inches) D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-100kHz	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-100kHz
350 VOLTS DC WORKING; 400 VOLTS DC SURGE (Cont.)						
100	53D101F350ME6	1.375 x 1.125	1640.0	883.0	0.536	0.729
180	53D181F350MJ6	1.375 x 1.625	848.0	458.0	0.841	1.14
330	53D331F350MP6	1.375 x 2.625	445.0	241.0	1.39	1.89
390	53D391F350MS6	1.375 x 3.125	352.0	192.0	1.68	2.27
470	53D471F350MT6	1.375 x 3.625	297.0	162.0	1.94	2.63
560	53D561F350MD6	1.375 x 4.125	257.0	140.0	2.20	2.98
400 VOLTS DC WORKING; 450 VOLTS DC SURGE						
18	53D180F400GE6	0.750 x 1.125	9718.0	5384.0	0.15	0.20
39	53D390F400GJ6	0.750 x 1.625	4546.0	2519.0	0.25	0.34
68	53D680F400GP6	0.750 x 2.625	2209.0	1225.0	0.44	0.59
82	53D820F400GS6	0.750 x 3.125	1756.0	974.0	0.53	0.71
100	53D101F400GT6	0.750 x 3.625	1559.0	865.0	0.60	0.81
27	53D270F400HE6	0.875 x 1.125	6156.0	3413.0	0.21	0.28
56	53D560F400HJ6	0.875 x 1.625	2910.0	1614.0	0.34	0.46
120	53D121F400HP6	0.875 x 2.625	1435.0	796.0	0.59	0.80
150	53D151F400HS6	0.875 x 3.125	1210.0	672.0	0.70	0.94
180	53D181F400HT6	0.875 x 3.625	982.0	546.0	0.83	1.11
39	53D390F400JE6	1.000 x 1.125	4634.0	2570.0	0.26	0.35
68	53D680F400JJ6	1.000 x 1.625	2171.0	1205.0	0.43	0.58
150	53D151F400JP6	1.000 x 2.625	1131.0	628.0	0.72	0.97
180	53D181F400JS6	1.000 x 3.125	878.0	488.0	0.88	1.18
220	53D221F400JT6	1.000 x 3.625	718.0	400.0	0.04	1.39
47	53D470F400KE6	1.125 x 1.125	3717.0	2063.0	0.31	0.42
100	53D101F400KJ6	1.125 x 1.625	1697.0	943.0	0.52	0.70
180	53D181F400KP6	1.125 x 2.625	838.0	466.0	0.90	1.20
220	53D221F400KS6	1.125 x 3.125	691.0	384.0	1.06	1.43
270	53D271F400KT6	1.125 x 3.625	567.0	316.0	1.25	1.68
330	53D331F400KD6	1.125 x 4.125	481.0	268.0	1.44	1.92
68	53D680F400ME6	1.375 x 1.125	2408.0	1340.0	0.44	0.59
150	53D151F400MJ6	1.375 x 1.625	1160.0	647.0	0.72	0.96
270	53D271F400MP6	1.375 x 2.625	574.0	320.0	1.22	1.64
330	53D331F400MS6	1.375 x 3.125	446.0	250.0	1.49	1.99
390	53D391F400MT6	1.375 x 3.625	373.0	209.0	1.73	2.31
470	53D471F400MD6	1.375 x 4.125	321.0	180.0	1.97	2.63
450 VOLTS DC WORKING; 525 VOLTS DC SURGE						
15	53D150F450GE6	0.750 x 1.125	10276.0	5483.0	0.14	0.20
33	53D330F450GJ6	0.750 x 1.625	4789.0	2556.0	0.24	0.33
68	53D680F450GP6	0.750 x 2.625	2322.0	1240.0	0.43	0.59
82	53D820F450GS6	0.750 x 3.125	1848.0	987.0	0.52	0.71
100	53D101F450GT6	0.750 x 3.625	1534.0	820.0	0.61	0.83
22	53D220F450HE6	0.875 x 1.125	6463.0	3450.0	0.20	0.27
47	53D470F450HJ6	0.875 x 1.625	3049.0	1628.0	0.33	0.46
100	53D101F450HP6	0.875 x 2.625	1488.0	796.0	0.58	0.80
120	53D121F450HS6	0.875 x 3.125	1224.0	655.0	0.69	0.95
150	53D151F450HT6	0.875 x 3.625	1047.0	560.0	0.80	1.09
33	53D330F450JE6	1.000 x 1.125	4863.0	2598.0	0.25	0.34
68	53D680F450JJ6	1.000 x 1.625	2238.0	1197.0	0.42	0.58
120	53D121F450JP6	1.000 x 2.625	1138.0	609.0	0.72	0.98
150	53D151F450JS6	1.000 x 3.125	922.0	494.0	0.86	1.18
180	53D181F450JT6	1.000 x 3.625	738.0	395.0	1.03	1.40

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size (inches) D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-100kHz	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-100kHz
450 VOLTS DC WORKING; 525 VOLTS DC SURGE (Cont.)						
39	53D390F450KE6	1.125 x 1.125	3901.0	2086.0	0.30	0.41
82	53D820F450KJ6	1.125 x 1.625	1770.0	948.0	0.51	0.70
180	53D181F450KP6	1.125 x 2.625	874.0	468.0	0.88	1.20
220	53D221F450KS6	1.125 x 3.125	706.0	379.0	1.05	1.44
270	53D271F450KT6	1.125 x 3.625	593.0	318.0	1.22	1.67
330	53D331F450KD6	1.125 x 4.125	511.0	274.0	1.39	1.90
68	53D680F450ME6	1.375 x 1.125	2495.0	1338.0	0.43	0.59
120	53D121F450MJ6	1.375 x 1.625	1262.0	677.0	0.69	0.94
270	53D271F450MP6	1.375 x 2.625	559.0	322.0	1.20	1.63
330	53D331F450MS6	1.375 x 3.125	468.0	252.0	1.45	1.98
390	53D391F450MT6	1.375 x 3.625	394.0	213.0	1.68	2.29
470	53D471F450MD6	1.375 x 4.125	333.0	180.0	1.93	2.63

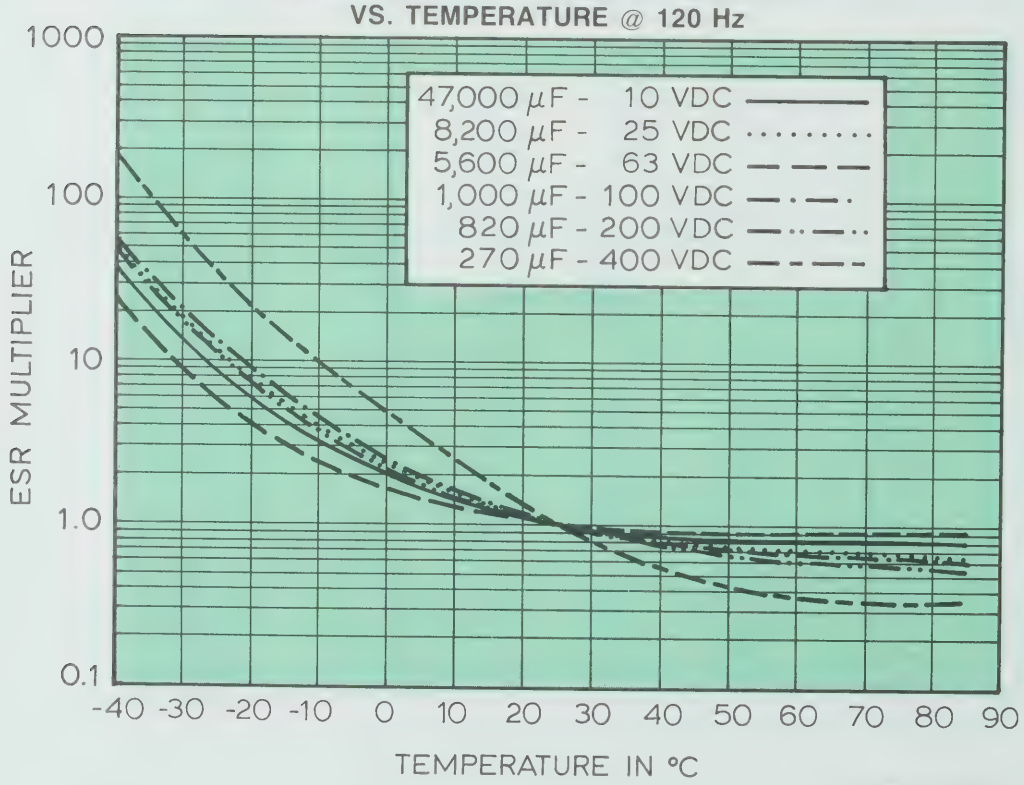
TYPICAL CURVES

TYPE 53D — TYPICAL CAPACITANCE MULTIPLIER
VS. TEMPERATURE @ 120 Hz



Dwg. No A-14,728

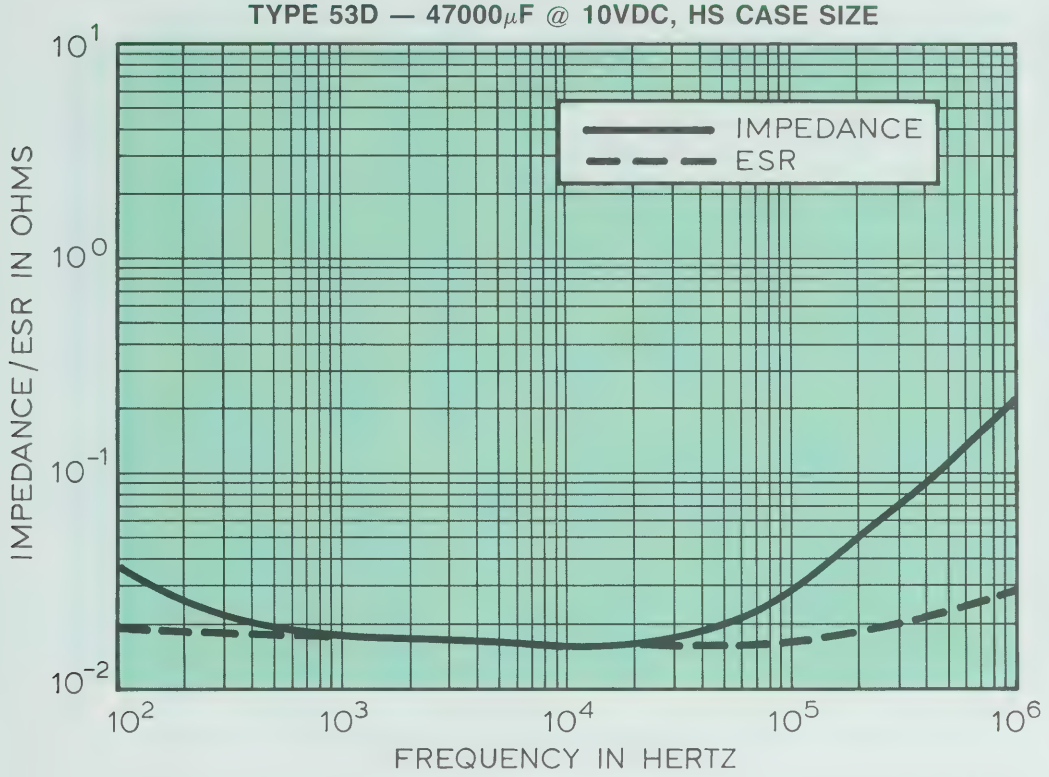
TYPE 53D — TYPICAL ESR MULTIPLIER
VS. TEMPERATURE @ 120 Hz



Dwg. No. A-14,721

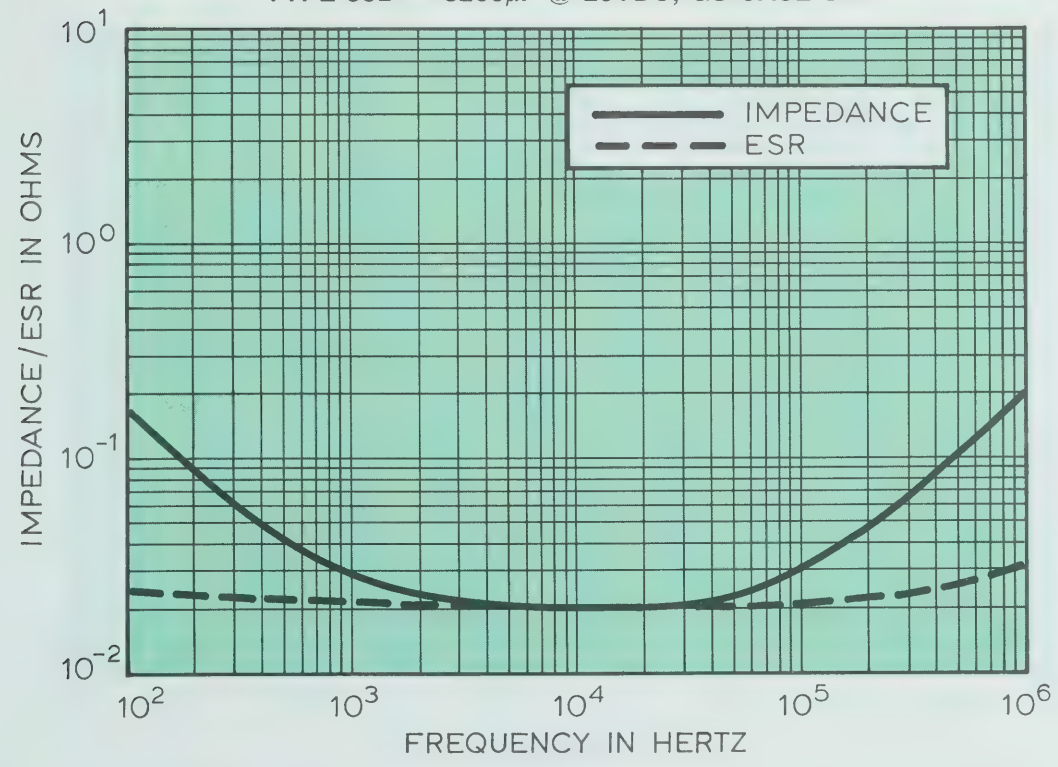
TYPICAL CURVES @ +25°C

TYPE 53D — 47000μF @ 10VDC, HS CASE SIZE



Dwg. No. A-14,643

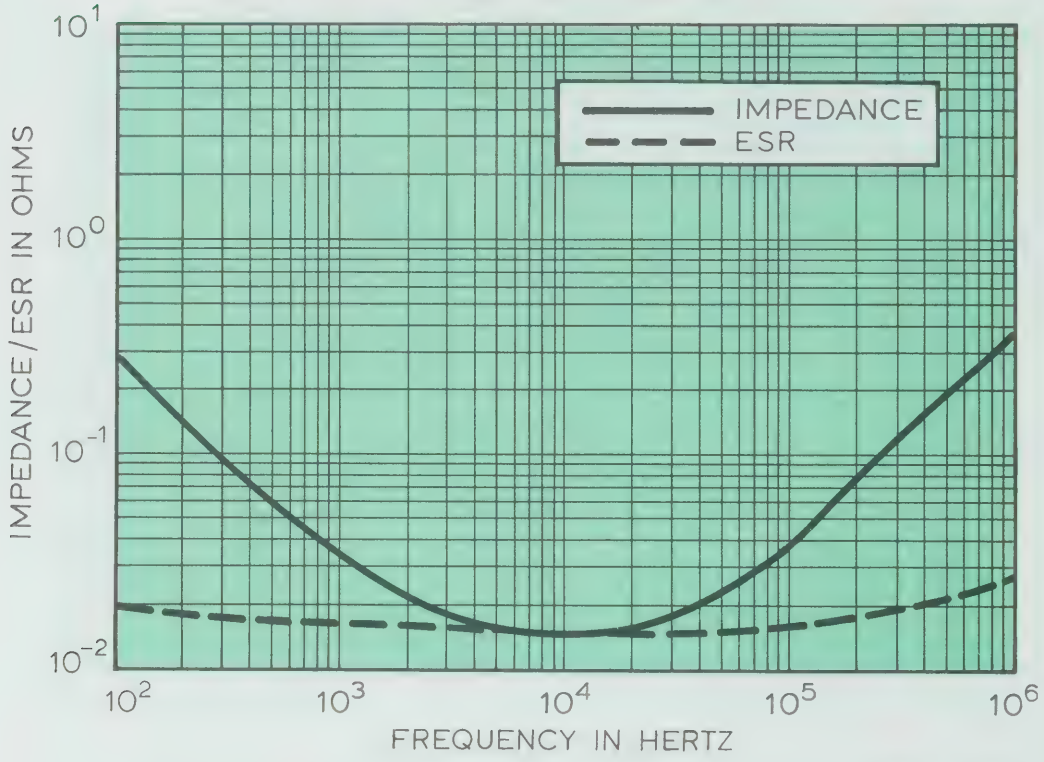
TYPE 53D — 8200μF @ 25VDC, GS CASE SIZE



Dwg. No. A-14,644

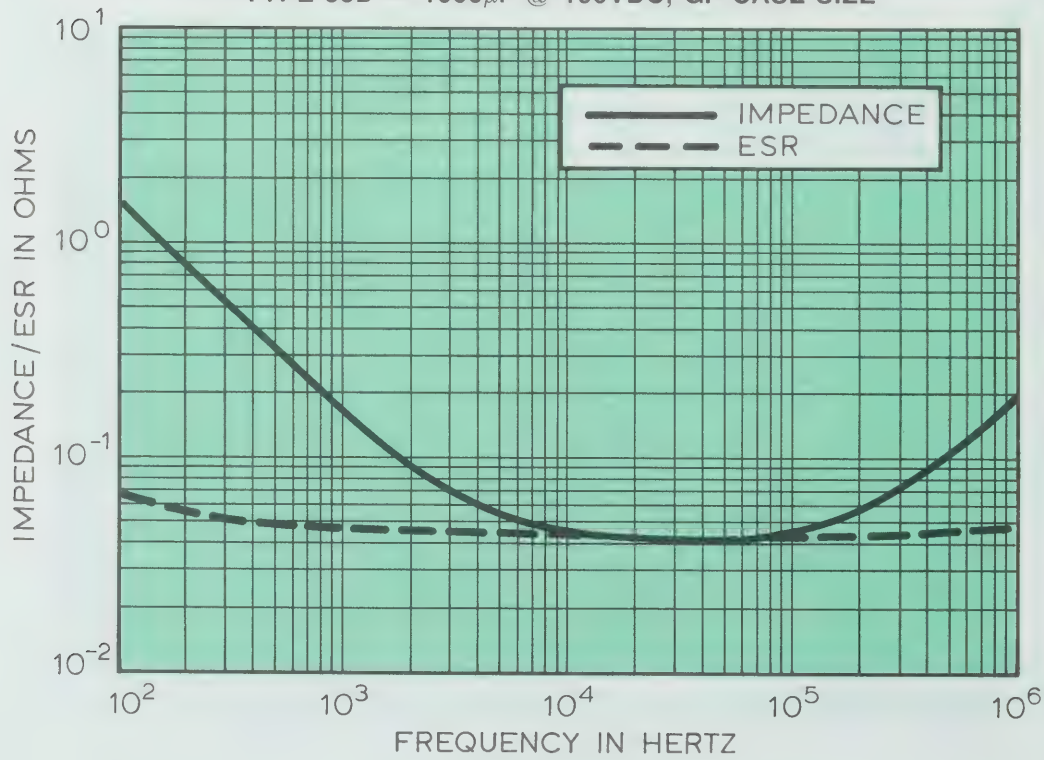
TYPICAL CURVES @ +25°C

TYPE 53D — 5600μF @ 63VDC, HT CASE SIZE



Dwg. No. A-14,645

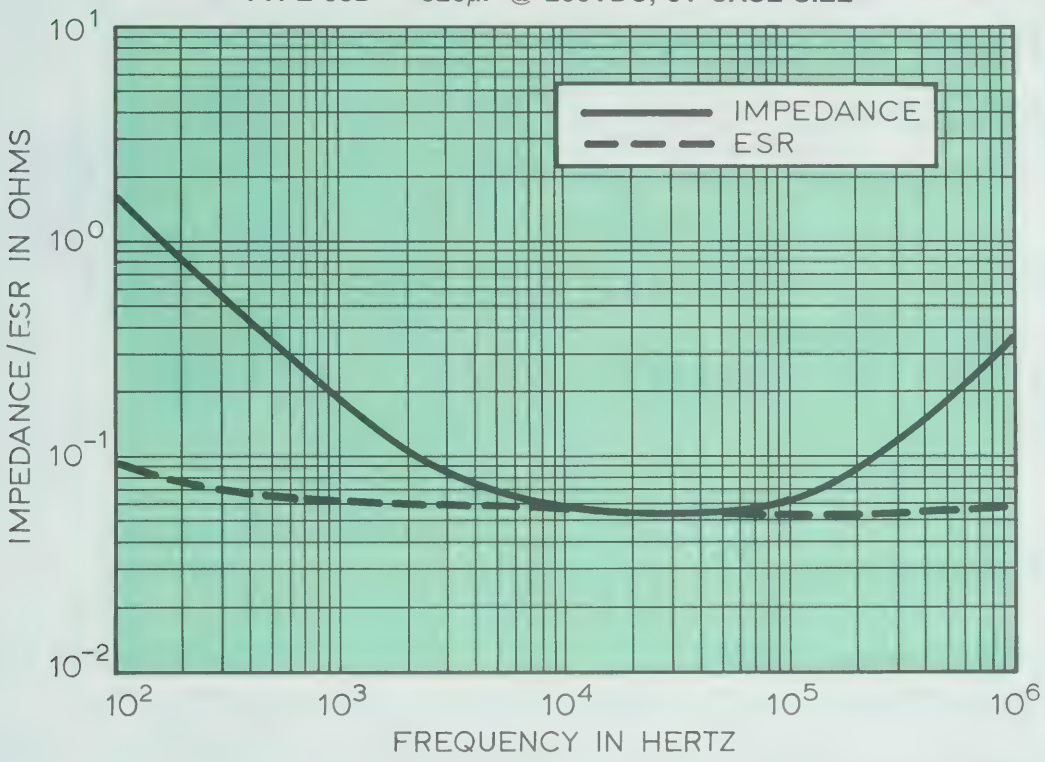
TYPE 53D — 1000μF @ 100VDC, GP CASE SIZE



Dwg. No. A-14,646

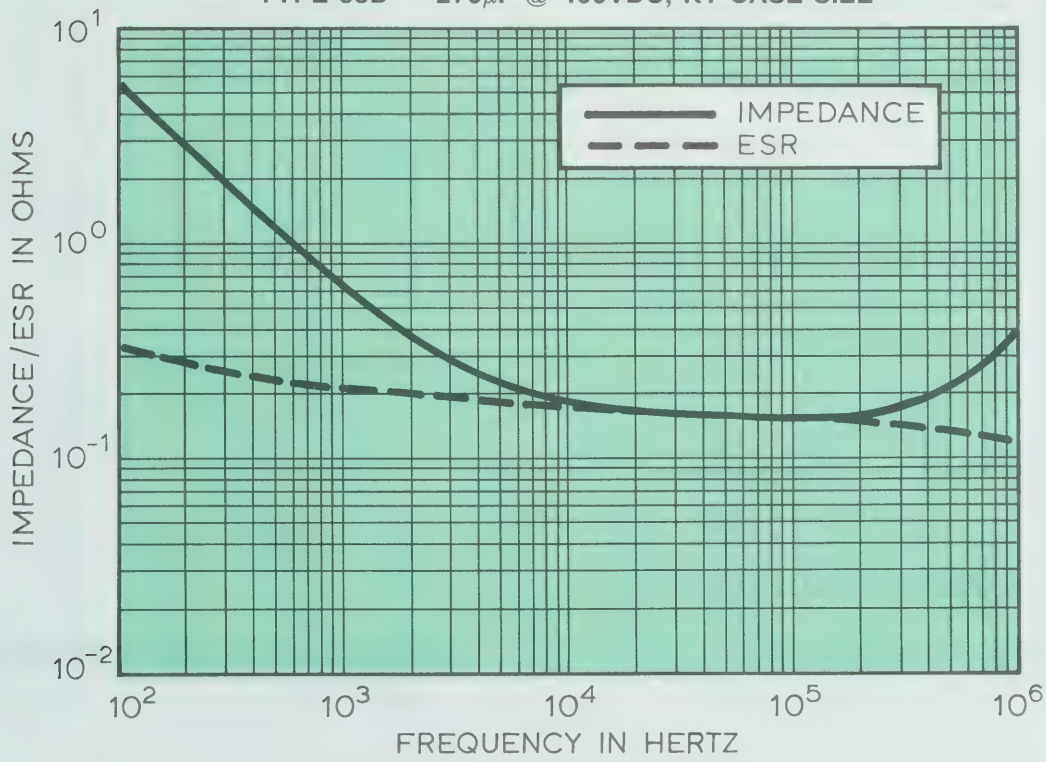
TYPICAL CURVES @ +25°C

TYPE 53D — 820μF @ 200VDC, JT CASE SIZE



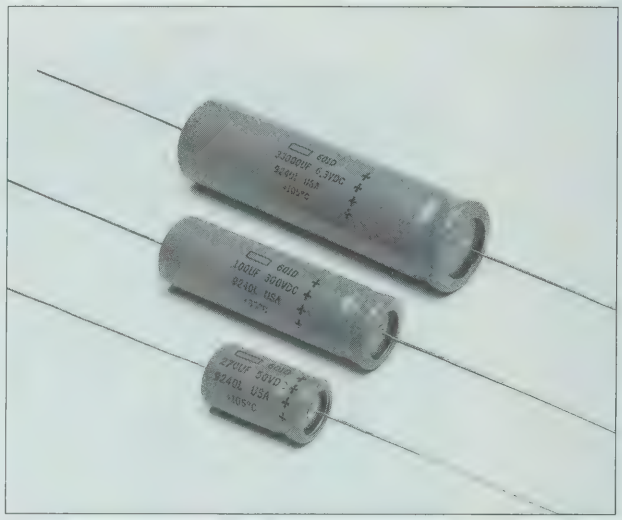
Dwg. No. A-14,647

TYPE 53D — 270μF @ 400VDC, KT CASE SIZE



Dwg. No. A-14,648

+105°C Tubular Axial Lead Aluminum Capacitors



L65-08

Features —

- Wide Temperature Range
- Military Version — MIL-C-39018/03
- Long Life
- Low ESR

General Specifications —

Operating Temperature:
−55°C to +105°C.

Voltage Range: 6.3 - 300 VDC.

Capacitance Range: 12μF - 33,000μF.

Capacitance Tolerance: −10%, +50%.

Case Size Range: 0.625″ x 1.125″ - 1.0″ x 3.625″.

Termination: Axial lead.

Life Validation Test: 2000 hrs @ +105°C:
Δ CAP ≤ 15% from initial measurement.
Δ ESR ≤ 1.25x initial specified limit.
Δ DCL ≤ initial specified limit.

Shelf Test: 500 hrs @ +105°C:
Δ CAP ≤ 10% from initial measurement.
Δ ESR ≤ 1.15x initial specified limit.
Δ DCL ≤ 2x initial specified limit.

DC Leakage Current: 5 min. charge time.
$I = K\sqrt{CV}$
K = .5 @ +25°C; = 3.0 @ +105°C
I in μA, C in μF, V in Volts

Ripple Current Multipliers:

TEMPERATURE

Ambient Temp.	Multipliers
+105°C	0.4
+85°C	1.0
+75°C	1.41
+65°C	1.7
+45°C	2.0
+25°C	2.65

FREQUENCY Hz

Rated WVDC	50-60	300-400	1000 and up
0-60	0.85	1.10	1.15
61-250	0.83	1.15	1.20

Low Temperature Performance:

Capacitance Ratio $C_{-55°C}/C_{+25°C}$ min. @ 120Hz

Rated Voltage (VDC)	Capacitance Remaining
0 to 25	75
26 to 100	80
101 to 250	85

ESR Ratio $ESR_{-55°C}/ESR_{+25°C}$ max. @ 120Hz

Rated Voltage (VDC)	Multiplier
0 to 9	10
10 to 40	12
41 to 100	18
150 to 300	100

Performance Characteristics —

SEE PAGE 2.

Catalog Numbering System

601D 158 F 6R3 FE 1

STYLE NUMBER.
1 = PVC SLEEVE (Standard).
2 = POLYESTER SLEEVE.
3 = POLYESTER SLEEVE WITH RESIN END SEAL.
7 = PVC SLEEVE WITH RESIN END SEAL.
(Recommended for exposure to halogenated cleaning solvents).

CASE CODE. SEE DIMENSIONS, BELOW.

DC VOLTAGE RATING. EXPRESSED IN VOLTS. 'R' SIGNIFIES A DECIMAL POINT, FOR EXAMPLE, 6R3 = 6.3 VOLTS.

CAPACITANCE TOLERANCE. F = −10, +50%.

CAPACITANCE. EXPRESSED IN PICOFARADS. THE FIRST TWO DIGITS ARE SIGNIFICANT FIGURES, THE THIRD IS THE NUMBER OF ZEROS.

TYPE NUMBER. IDENTIFIES THE BASIC CAPACITOR DESIGN.

DIMENSIONS IN INCHES

Case Code	STYLE 1, 2 Insulating Sleeve		STYLE 3, 7 Insulating Sleeve, Coated End-Seal		Typical Weight (Oz).
	D ± 0.020	L ± 0.062	D ± 0.020	L ± 0.062	
FE	0.635	1.141	0.635	1.187	0.32
FJ	0.635	1.641	0.635	1.687	0.42
FL	0.635	2.141	0.635	2.187	0.56
FP	0.635	2.641	0.635	2.687	0.67
FS	0.635	3.141	0.635	3.187	0.81
FT	0.635	3.641	0.635	3.687	0.92
GE	0.760	1.141	0.760	1.187	0.46
GJ	0.760	1.641	0.760	1.687	0.63
GL	0.760	2.141	0.760	2.187	0.81
GP	0.760	2.641	0.760	2.687	0.98
GS	0.760	3.141	0.760	3.187	1.16
GT	0.760	3.641	0.760	3.687	1.33
HE	0.885	1.141	0.885	1.187	0.63
HJ	0.885	1.641	0.885	1.687	0.88
HL	0.885	2.141	0.885	2.187	1.09
HP	0.885	2.641	0.885	2.687	1.34
HS	0.885	3.141	0.885	3.187	1.58
HT	0.885	3.641	0.885	3.687	1.83
JE	1.010	1.141	1.010	1.187	0.81
JJ	1.010	1.641	1.010	1.687	1.12
JL	1.010	2.141	1.010	2.187	1.44
JP	1.010	2.641	1.010	2.687	1.76
JS	1.010	3.141	1.010	3.187	2.08
JT	1.010	3.641	1.010	3.687	2.39

DIMENSIONS IN MILLIMETERS

Case Code	STYLE 1, 2 Insulating Sleeve		STYLE 3, 7 Insulating Sleeve, Coated End-Seal		Typical Weight (Grams)
	D ± 0.51	L ± 1.58	D ± 0.51	L ± 1.58	
FE	16.1	29.0	16.1	30.2	9
FJ	16.1	41.7	16.1	42.9	12
FL	16.1	54.4	16.1	55.6	16
FP	16.1	67.1	16.1	68.3	19
FS	16.1	79.8	16.1	81.0	23
FT	16.1	92.5	16.1	93.7	26
GE	19.3	29.0	19.3	30.2	13
GJ	19.3	41.7	19.3	42.9	18
GL	19.3	54.4	19.3	55.6	23
GP	19.3	67.1	19.3	68.3	28
GS	19.3	79.8	19.3	81.0	33
GT	19.3	92.5	19.3	93.7	38
HE	22.5	29.0	22.5	30.2	18
HJ	22.5	41.7	22.5	42.9	25
HL	22.5	54.4	22.5	55.6	31
HP	22.5	67.1	22.5	68.3	38
HS	22.5	79.8	22.5	81.0	45
HT	22.5	92.5	22.5	93.7	52
JE	25.7	29.0	25.7	30.2	23
JJ	25.7	41.7	25.7	42.9	32
JL	25.7	54.4	25.7	55.6	41
JP	25.7	67.1	25.7	68.3	50
JS	25.7	79.8	25.7	81.0	59
JT	25.7	92.5	25.7	93.7	68

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size Inches D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-100kHz	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-100kHz
6.3 VOLTS DC WORKING; 8 VOLTS DC SURGE						
1500	601D158F6R3FE1	0.625 x 1.125	311.0	227.0	1.04	1.22
2700	601D278F6R3FJ1	0.625 x 1.625	148.0	108.0	1.76	2.05
3900	601D398F6R3FL1	0.625 x 2.125	98.0	72.0	2.41	2.81
5600	601D568F6R3FP1	0.625 x 2.625	74.0	55.0	3.05	3.54
6800	601D688F6R3FS1	0.625 x 3.125	60.0	44.0	3.66	4.25
8200	601D828F6R3FT1	0.625 x 3.625	51.0	38.0	4.26	4.94
2700	601D278F6R3GE1	0.750 x 1.125	169.0	124.0	1.58	1.84
5600	601D568F6R3GJ1	0.750 x 1.625	83.0	61.0	2.60	3.02
8200	601D828F6R3GL1	0.750 x 2.125	57.0	42.0	3.52	4.07
10000	601D109F6R3GP1	0.750 x 2.625	43.0	32.0	4.40	5.09
12000	601D129F6R3GS1	0.750 x 3.125	37.0	28.0	5.13	5.91
15000	601D159F6R3GT1	0.750 x 3.625	31.0	23.0	5.98	6.89
3900	601D398F6R3HE1	0.875 x 1.125	118.0	88.0	2.09	2.42
8200	601D828F6R3HJ1	0.875 x 1.625	59.0	44.0	3.38	3.90
12000	601D129F6R3HL1	0.875 x 2.125	42.0	31.0	4.47	5.15
15000	601D159F6R3HP1	0.875 x 2.625	33.0	24.0	5.54	6.37
18000	601D189F6R3HS1	0.875 x 3.125	27.0	20.0	6.56	7.50
22000	601D229F6R3HT1	0.875 x 3.625	23.0	18.0	7.52	8.61
5600	601D568F6R3JE1	1.000 x 1.125	93.0	69.0	2.57	2.96
10000	601D109F6R3JJ1	1.000 x 1.625	49.0	36.0	4.05	4.66
18000	601D189F6R3JL1	1.000 x 2.125	33.0	25.0	5.44	6.23
22000	601D229F6R3JP1	1.000 x 2.625	26.0	20.0	6.72	7.68
27000	601D279F6R3JS1	1.000 x 3.125	22.0	17.0	7.86	8.91
33000	601D339F6R3JT1	1.000 x 3.625	19.0	15.0	8.98	10.18
10 VOLTS DC WORKING; 15 VOLTS DC SURGE						
1000	601D108F010FE1	0.625 x 1.125	332.0	233.0	1.00	1.21
2200	601D228F010FJ1	0.625 x 1.625	157.0	111.0	1.70	2.03
3300	601D338F010FL1	0.625 x 2.125	106.0	75.0	2.31	2.76
4700	601D478F010FP1	0.625 x 2.625	80.0	57.0	2.94	3.50
5600	601D568F010FS1	0.625 x 3.125	65.0	47.0	3.52	4.17
6800	601D688F010FT1	0.625 x 3.625	55.0	39.0	4.11	4.87
2200	601D228F010GE1	0.750 x 1.125	182.0	129.0	1.53	1.81
3900	601D398F010GJ1	0.750 x 1.625	91.0	65.0	2.50	2.96
6800	601D688F010GL1	0.750 x 2.125	61.0	44.0	3.40	4.03
8200	601D828F010GP1	0.750 x 2.625	47.0	34.0	4.25	5.01
10000	601D109F010GS1	0.750 x 3.125	41.0	29.0	5.00	5.82
12000	601D129F010GT1	0.750 x 3.625	35.0	25.0	5.72	6.71
3300	601D338F010HE1	0.875 x 1.125	127.0	90.0	2.02	2.39
5600	601D568F010HJ1	0.875 x 1.625	64.0	46.0	3.26	3.84
8200	601D828F010HL1	0.875 x 2.125	44.0	32.0	4.38	5.14
12000	601D129F010HP1	0.875 x 2.625	36.0	26.0	5.30	6.22
15000	601D159F010HS1	0.875 x 3.125	29.0	20.0	6.43	7.50
18000	601D189F010HT1	0.875 x 3.625	25.0	18.0	7.37	8.56
3900	601D398F010JE1	1.000 x 1.125	99.0	71.0	2.49	2.93
8200	601D828F010JJ1	1.000 x 1.625	50.0	37.0	4.00	4.67
13000	601D139F010JL1	1.000 x 2.125	36.0	26.0	5.27	6.15
18000	601D189F010JP1	1.000 x 2.625	28.0	21.0	6.45	7.49
22000	601D229F010JS1	1.000 x 3.125	23.0	17.0	7.68	8.86
27000	601D279F010JT1	1.000 x 3.625	20.0	15.0	8.75	10.08

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size Inches D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-100kHz	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-100kHz
16 VOLTS DC WORKING; 20 VOLTS DC SURGE						
820	601D827F016FE1	0.625 x 1.125	349.0	230.0	0.99	1.21
1800	601D188F016FJ1	0.625 x 1.625	175.0	116.0	1.62	1.98
2700	601D278F016FL1	0.625 x 2.125	115.0	77.0	2.23	2.73
3300	601D338F016FP1	0.625 x 2.625	87.0	58.0	2.83	3.45
3900	601D398F016FS1	0.625 x 3.125	71.0	48.0	3.37	4.11
4700	601D478F016FT1	0.625 x 3.625	60.0	40.0	3.94	4.79
1500	601D158F016GE1	0.750 x 1.125	198.0	132.0	1.47	1.79
3300	601D338F016GJ1	0.750 x 1.625	98.0	66.0	2.40	2.92
4700	601D478F016GL1	0.750 x 2.125	67.0	45.0	3.26	3.95
5600	601D568F016GP1	0.750 x 2.625	51.0	35.0	4.07	4.93
8200	601D828F016GS1	0.750 x 3.125	42.0	29.0	4.87	5.86
10000	601D109F016GT1	0.750 x 3.625	36.0	25.0	5.64	6.78
2200	601D228F016HE1	0.875 x 1.125	139.0	94.0	1.93	2.34
4700	601D478F016HJ1	0.875 x 1.625	70.0	48.0	3.12	3.77
6800	601D688F016HL1	0.875 x 2.125	48.0	33.0	4.20	5.05
10000	601D109F016HP1	0.875 x 2.625	37.0	26.0	5.23	6.27
12000	601D129F016HS1	0.875 x 3.125	31.0	22.0	6.19	7.38
15000	601D159F016HT1	0.875 x 3.625	27.0	19.0	7.06	8.40
3300	601D338F016JE1	1.000 x 1.125	108.0	75.0	2.38	2.87
6800	601D688F016JJ1	1.000 x 1.625	55.0	38.0	3.83	4.59
10000	601D109F016JL1	1.000 x 2.125	38.0	27.0	5.10	6.09
25 VOLTS DC WORKING; 40 VOLTS DC SURGE						
560	601D567F025FE1	0.625 x 1.125	383.0	237.0	0.941	1.20
1000	601D108F025FJ1	0.625 x 1.625	198.0	124.0	1.52	1.92
1500	601D158F025FL1	0.625 x 2.125	125.0	78.0	2.14	2.71
2200	601D228F025FP1	0.625 x 2.625	96.0	61.0	2.68	3.38
2700	601D278F025FS1	0.625 x 3.125	78.0	50.0	3.22	4.04
3300	601D338F025FT1	0.652 x 3.625	65.0	41.0	3.79	4.75
1000	601D108F025GE1	0.750 x 1.125	213.0	134.0	1.41	1.78
1800	601D188F025GJ1	0.750 x 1.625	110.0	70.0	2.27	2.85
2700	601D278F025GL1	0.750 x 2.125	73.0	47.0	3.11	3.89
3900	601D398F025GP1	0.750 x 2.625	56.0	36.0	3.91	4.87
4700	601D478F025GS1	0.750 x 3.125	45.0	29.0	4.68	5.80
5600	601D568F025GT1	0.750 x 3.625	38.0	25.0	5.43	6.70
1500	601D158F025HE1	0.875 x 1.125	157.0	100.0	1.81	2.27
2700	601D278F025HJ1	0.875 x 1.625	76.0	49.0	2.98	3.72
3900	601D398F025HL1	0.875 x 2.125	52.0	34.0	4.04	5.01
5600	601D568F025HP1	0.875 x 2.625	40.0	26.0	5.04	6.20
6800	601D688F025HS1	0.875 x 3.125	33.0	22.0	6.00	7.33
8200	601D828F025HT1	0.875 x 3.625	28.0	19.0	6.91	8.42
1800	601D188F025JE1	1.000 x 1.125	117.0	76.0	2.28	2.83
3900	601D398F025JJ1	1.000 x 1.625	59.0	39.0	3.70	4.55
5600	601D568F025JL1	1.000 x 2.125	40.0	27.0	4.96	6.07
8200	601D828F025JP1	1.000 x 2.625	31.0	21.0	6.14	7.44
10000	601D109F025JS1	1.000 x 3.125	27.0	18.0	7.15	8.64
12000	601D129F025JT1	1.000 x 3.625	23.0	16.0	8.21	9.89

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size Inches D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-100kHz	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-100kHz
35 VOLTS DC WORKING; 50 VOLTS DC SURGE						
330	601D337F035FE1	0.625 x 1.125	480	244	0.84	1.18
680	601D687F035FJ1	0.625 x 1.625	231.0	118.0	1.40	1.96
1000	601D108F035FL1	0.625 x 2.125	154.0	79.0	1.93	2.68
1500	601D158F035FP1	0.625 x 2.625	118.0	61.0	2.42	3.35
1800	601D188F035FS1	0.625 x 3.125	95.0	50.0	2.91	4.02
2200	601D228F035FT1	0.625 x 3.625	80.0	42.0	3.40	4.67
680	601D687F035GE1	0.750 x 1.125	266.0	137.0	1.26	1.75
1200	601D128F035GJ1	0.750 x 1.625	133.0	70.0	2.06	2.84
2200	601D228F035GL1	0.750 x 2.125	87.0	46.0	2.84	3.89
2700	601D278F035GP1	0.750 x 2.625	68.0	36.0	3.52	4.80
3300	601D338F035GS1	0.750 x 3.125	54.0	29.0	4.25	5.75
3900	601D398F035GT1	0.750 x 3.625	46.0	25.0	4.95	6.67
1000	601D108F035HE1	0.875 x 1.125	182.0	96.0	1.68	2.31
2200	601D228F035HJ1	0.875 x 1.625	91.0	49.0	2.73	3.72
2700	601D278F035HL1	0.875 x 2.125	62.0	34.0	3.67	4.94
3900	601D398F035HP1	0.875 x 2.625	47.0	26.0	4.61	6.17
4700	601D478F035HS1	0.875 x 3.125	39.0	22.0	5.46	7.26
5600	601D568F035HT1	0.875 x 3.625	33.0	19.0	6.33	8.35
1200	601D128F035JE1	1.000 x 1.125	146.0	79.0	2.04	2.77
2700	601D278F035JJ1	1.000 x 1.625	71.0	39.0	3.35	4.49
3900	601D398F035JL1	1.000 x 2.125	48.0	27.0	4.52	5.99
5600	601D568F035JP1	1.000 x 2.625	37.0	21.0	5.62	7.37
6800	601D688F035JS1	1.000 x 3.125	30.0	18.0	6.66	8.67
8200	601D828F035JT1	1.000 x 3.625	26.0	15.0	7.66	9.92
50 VOLTS DC WORKING; 75 VOLTS DC SURGE						
270	601D277F050FE1	0.625 x 1.125	519	241	0.81	1.19
470	601D477F050FJ1	0.625 x 1.625	249.0	117.0	1.35	1.98
680	601D687F050FL1	0.625 x 2.125	165.0	78.0	1.87	2.71
1000	601D108F050FP1	0.625 x 2.625	128.0	61.0	2.33	3.37
1200	601D128F050FS1	0.625 x 3.125	107.0	51.0	2.76	3.97
1500	601D158F050FT1	0.625 x 3.625	87.0	42.0	3.28	4.70
470	601D477F050GE1	0.750 x 1.125	285.0	135.0	1.22	1.77
1000	601D108F050GJ1	0.750 x 1.625	139.0	67.0	2.02	2.90
1500	601D158F050GL1	0.750 x 2.125	95.0	47.0	2.73	3.90
1800	601D188F050GP1	0.750 x 2.625	71.0	35.0	3.45	4.90
2200	601D228F050GS1	0.750 x 3.125	60.0	30.0	4.08	5.75
2700	601D278F050GT1	0.750 x 3.625	50.0	25.0	4.76	6.67
680	601D687F050HE1	0.875 x 1.125	196.0	95.0	1.62	2.32
1500	601D158F050HJ1	0.875 x 1.625	99.0	49.0	2.63	3.72
2200	601D228F050HL1	0.875 x 2.125	67.0	34.0	3.55	4.99
2700	601D278F050HP1	0.875 x 2.625	51.0	27.0	4.44	6.17
3300	601D338F050HS1	0.875 x 3.125	42.0	22.0	5.28	7.29
3900	601D398F050HT1	0.875 x 3.625	36.0	19.0	6.12	8.38
1000	601D108F050JE1	1.000 x 1.125	148.0	75.0	2.03	2.86
1800	601D188F050JJ1	1.000 x 1.625	77.0	40.0	3.23	4.50
2700	601D278F050JL1	1.000 x 2.125	52.0	28.0	4.37	6.00
3900	601D398F050JP1	1.000 x 2.625	40.0	22.0	5.44	7.40
4700	601D478F050JS1	1.000 x 3.125	33.0	18.0	6.47	8.69
5600	601D568F050JT1	1.000 x 3.625	28.0	16.0	7.45	9.92

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size Inches D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-100kHz	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-100kHz
63 VOLTS DC WORKING; 90 VOLTS DC SURGE						
220	601D227F063FE1	0.625 x 1.125	563	250	0.78	1.16
470	601D477F063FJ1	0.625 x 1.625	269.0	121.0	1.30	1.94
680	601D687F063FL1	0.625 x 2.125	178.0	80.0	1.80	2.67
820	601D827F063FP1	0.625 x 2.625	134.0	61.0	2.27	3.36
1000	601D108F063FS1	0.625 x 3.125	111.0	51.0	2.70	3.98
1200	601D128F063FT1	0.625 x 3.625	95.0	44.0	3.13	4.59
390	601D397F063GE1	0.750 x 1.125	304.0	138.0	1.18	1.75
820	601D827F063GJ1	0.750 x 1.625	150.0	69.0	1.94	2.86
1200	601D128F063GL1	0.750 x 2.125	105.0	49.0	2.59	3.79
1500	601D158F063GP1	0.750 x 2.625	80.0	38.0	3.26	4.73
1800	601D188F063GS1	0.750 x 3.125	62.0	30.0	3.99	5.75
2200	601D228F063GT1	0.750 x 3.625	53.0	26.0	4.62	6.62
680	601D687F063HE1	0.875 x 1.125	210.0	98.0	1.57	2.30
1200	601D128F063HJ1	0.875 x 1.625	109.0	52.0	2.50	3.63
1800	601D188F063HL1	0.875 x 2.125	70.0	34.0	3.47	4.97
2200	601D228F063HP1	0.875 x 2.625	54.0	27.0	4.31	6.13
2700	601D278F063HS1	0.875 x 3.125	45.0	23.0	5.12	7.21
3900	601D398F063HT1	0.875 x 3.625	38.0	19.0	5.98	8.33
820	601D827F063JE1	1.000 x 1.125	158.0	76.0	1.97	2.83
1800	601D188F063JJ1	1.000 x 1.625	81.0	40.0	3.14	4.46
2700	601D278F063JL1	1.000 x 2.125	55.0	28.0	4.25	5.97
3300	601D338F063JP1	1.000 x 2.625	42.0	22.0	5.31	7.35
3900	601D398F063JS1	1.000 x 3.125	34.0	18.0	6.31	8.64
4700	601D478F063JT1	1.000 x 3.625	29.0	16.0	7.29	9.89
100 VOLTS DC WORKING; 150 VOLTS DC SURGE						
68	601D686F100FE1	0.625 x 1.125	1714	727	.444	.683
120	601D127F100FJ1	0.625 x 1.625	869.0	370.0	.725	1.11
180	601D187F100FL1	0.625 x 2.125	561.0	240.0	1.01	1.55
270	601D277F100FP1	0.625 x 2.625	415.0	178.0	1.29	1.97
330	601D337F100FS1	0.625 x 3.125	330.0	142.0	1.57	2.39
390	601D397F100FT1	0.625 x 3.625	274.0	118.0	1.84	2.80
120	601D127F100GE1	0.750 x 1.125	986.0	421.0	.656	1.00
270	601D277F100GJ1	0.750 x 1.625	461.0	198.0	1.11	1.69
390	601D397F100GL1	0.750 x 2.125	302.0	131.0	1.53	2.33
470	601D477F100GP1	0.750 x 2.625	230.0	100.0	1.92	2.91
560	601D567F100GS1	0.750 x 3.125	183.0	80.0	2.33	3.52
680	601D687F100GT1	0.750 x 3.625	152.0	67.0	2.73	4.11
180	601D187F100HE1	0.875 x 1.125	632.0	273.0	0.903	1.38
390	601D397F100HJ1	0.875 x 1.625	308.0	134.0	1.49	2.25
560	601D567F100HL1	0.875 x 2.125	205.0	90.0	2.03	3.06
680	601D687F100HP1	0.875 x 2.625	155.0	68.0	2.56	3.84
820	601D827F100HS1	0.875 x 3.125	124.0	56.0	3.08	4.60
1000	601D108F100HT1	0.875 x 3.625	108.0	48.0	3.53	5.26
270	601D277F100JE1	1.000 x 1.125	469.0	205.0	1.14	1.73
470	601D477F100JJ1	1.000 x 1.625	226.0	100.0	1.88	2.83
820	601D827F100JL1	1.000 x 2.125	152.0	68.0	2.56	3.82
1000	601D108F100JP1	1.000 x 2.625	120.0	54.0	3.14	4.67
1200	601D128F100JS1	1.000 x 3.125	93.0	43.0	3.83	5.66
1500	601D158F100JT1	1.000 x 3.625	81.0	37.0	4.37	6.45

STANDARD RATINGS

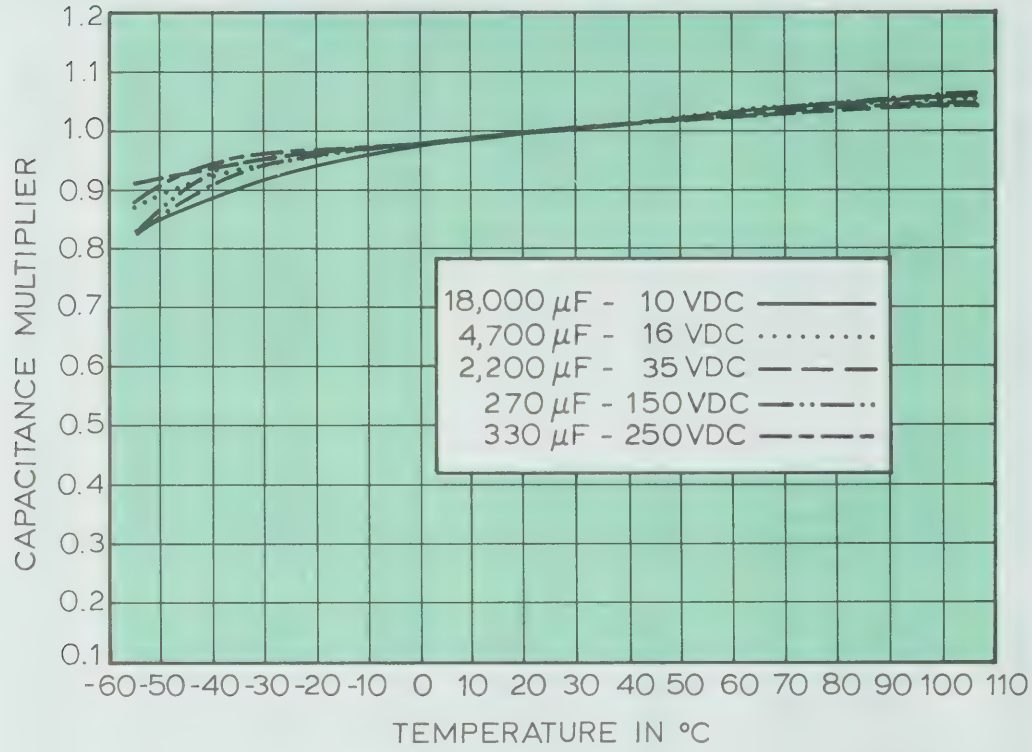
μF	Catalog Number	Nominal Case Size Inches D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-100kHz	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-100kHz
150 VOLTS DC WORKING; 200 VOLTS DC SURGE						
33	601D336F150FE1	0.625 x 1.125	3518.0	1485.0	0.310	0.478
68	601D686F150FJ1	0.625 x 1.625	1677.0	709.0	0.522	0.802
100	601D107F150FL1	0.625 x 2.125	1114.0	472.0	0.718	1.10
120	601D127F150FP1	0.625 x 2.625	842.0	357.0	0.907	1.39
150	601D157F150FS1	0.625 x 3.125	672.0	286.0	1.10	1.68
180	601D187F150FT1	0.625 x 3.625	560.0	238.0	1.29	1.97
56	601D566F150GE1	0.750 x 1.125	2089.0	884.0	0.451	0.693
100	601D107F150GJ1	0.750 x 1.625	1033.0	438.0	0.740	1.14
150	601D157F150GL1	0.750 x 2.125	683.0	291.0	1.02	1.56
220	601D227F150GP1	0.750 x 2.625	511.0	218.0	1.29	1.97
270	601D277F150GS1	0.750 x 3.125	409.0	175.0	1.56	2.38
330	601D337F150GT1	0.750 x 3.625	341.0	146.0	1.82	2.78
82	601D826F150HE1	0.875 x 1.125	1395.0	593.0	0.608	0.932
150	601D157F150HJ1	0.875 x 1.625	695.0	297.0	0.989	1.51
270	601D277F150HL1	0.875 x 2.125	451.0	193.0	1.37	2.09
330	601D337F150HP1	0.875 x 2.625	345.0	148.0	1.71	2.61
390	601D397F150HS1	0.875 x 3.125	273.0	118.0	2.08	3.16
470	601D477F150HT1	0.875 x 3.625	226.0	98.0	2.44	3.70
100	601D107F150JE1	1.000 x 1.125	1082.0	463.0	0.753	1.15
220	601D227F150JJ1	1.000 x 1.625	502.0	216.0	1.26	1.93
330	601D337F150JL1	1.000 x 2.125	328.0	142.0	1.74	2.64
470	601D477F150JP1	1.000 x 2.625	244.0	107.0	2.20	3.33
560	601D567F150JS1	1.000 x 3.125	195.0	86.0	2.65	4.00
680	601D687F150JT1	1.000 x 3.625	165.0	73.0	3.07	4.63
200 VOLTS DC WORKING; 250 VOLTS DC SURGE						
27	601D276F200FE1	0.625 x 1.125	3985.0	1501.0	0.292	0.48
56	601D566F200FJ1	0.625 x 1.625	1892.0	714.0	0.491	0.80
82	601D826F200FL1	0.625 x 2.125	1242.0	469.0	0.680	1.11
100	601D107F200FP1	0.625 x 2.625	925.0	350.0	0.865	1.41
120	601D127F200FS1	0.625 x 3.125	761.0	288.0	1.032	1.67
150	601D157F200FT1	0.625 x 3.625	651.0	248.0	1.19	1.94
47	601D476F200GE1	0.750 x 1.125	2354.0	889.0	0.424	0.69
82	601D826F200GJ1	0.750 x 1.625	1142.0	433.0	0.704	1.14
120	601D127F200GL1	0.750 x 2.125	774.0	294.0	0.956	1.55
180	601D187F200GP1	0.750 x 2.625	578.0	220.0	1.21	1.96
220	601D227F200GS1	0.750 x 3.125	462.0	176.0	1.46	2.37
270	601D277F200GT1	0.750 x 3.625	385.0	147.0	1.71	2.77
68	601D686F200HE1	0.875 x 1.125	1569.0	596.0	0.573	0.930
120	601D127F200HJ1	0.875 x 1.625	787.0	300.0	0.930	1.51
180	601D187F200HL1	0.875 x 2.125	521.0	199.0	1.27	2.06
270	601D277F200HP1	0.875 x 2.625	390.0	150.0	1.61	2.59
330	601D337F200HS1	0.875 x 3.125	302.0	117.0	1.97	3.17
390	601D397F200HT1	0.875 x 3.625	254.0	98.0	2.30	3.69
82	601D826F200JE1	1.000 x 1.125	1128.0	432.0	0.737	1.19
180	601D187F200JJ1	1.000 x 1.625	560.0	216.0	1.20	1.93
270	601D277F200JL1	1.000 x 2.125	365.0	141.0	1.65	2.64
390	601D397F200JP1	1.000 x 2.625	278.0	108.0	2.06	3.29
470	601D477F200JS1	1.000 x 3.125	221.0	87.0	2.49	3.97
560	601D567F200JT1	1.000 x 3.625	183.0	72.0	2.91	4.63

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size Inches D x L	Max. ESR @ +25°C (mΩ) 120Hz	20k-100kHz	Max. Ripple Current @ +85°C (A) 120Hz	20k-100kHz
250 VOLTS DC WORKING; 300 VOLTS DC SURGE						
15	601D156F250FE1	0.625 x 1.125	7136.0	2854.0	0.22	0.34
33	601D336F250FJ1	0.625 x 1.625	3228.0	1292.0	0.38	0.59
47	601D476F250FL1	0.625 x 2.125	2132.0	854.0	0.52	0.82
68	601D686F250FP1	0.625 x 2.625	1591.0	638.0	0.66	1.04
82	601D826F250FS1	0.625 x 3.125	1270.0	510.0	0.80	1.26
100	601D107F250FT1	0.625 x 3.625	1057.0	425.0	0.94	1.48
27	601D276F250GE1	0.750 x 1.125	3614.0	1449.0	0.34	0.54
56	601D566F250GJ1	0.750 x 1.625	1721.0	691.0	0.57	0.90
100	601D107F250GL1	0.750 x 2.125	1130.0	454.0	0.79	1.25
120	601D127F250GP1	0.750 x 2.625	880.0	354.0	0.98	1.55
150	601D157F250GS1	0.750 x 3.125	690.0	278.0	1.20	1.88
180	601D187F250GT1	0.750 x 3.625	568.0	230.0	1.41	2.22
47	601D476F250HE1	0.875 x 1.125	2369.0	953.0	0.47	0.74
100	601D107F250HJ1	0.875 x 1.625	1148.0	463.0	0.77	1.21
150	601D157F250HL1	0.875 x 2.125	753.0	304.0	1.06	1.67
180	601D187F250HP1	0.875 x 2.625	574.0	232.0	1.33	2.08
220	601D227F250HS1	0.875 x 3.125	464.0	188.0	1.59	2.50
270	601D277F250HT1	0.875 x 3.625	375.0	153.0	1.89	2.96
56	601D566F250JE1	1.000 x 1.125	1708.0	689.0	0.60	0.94
120	601D127F250JJ1	1.000 x 1.625	829.0	336.0	0.98	1.54
180	601D187F250JL1	1.000 x 2.125	548.0	223.0	1.34	2.11
270	601D277F250JP1	1.000 x 2.625	410.0	167.0	1.69	2.65
330	601D337F250JS1	1.000 x 3.125	328.0	134.0	2.04	3.18
390	601D397F250JT1	1.000 x 3.625	274.0	112.0	2.38	3.71
300 VOLTS DC WORKING; 350 VOLTS DC SURGE						
12	601D126F300FE1	0.625 x 1.125	8217.0	2896.0	0.20	0.34
27	601D276F300FJ1	0.625 x 1.625	3809.0	1344.0	0.35	0.58
39	601D396F300FL1	0.625 x 2.125	2479.0	875.0	0.48	0.81
47	601D476F300FP1	0.625 x 2.625	1839.0	650.0	0.61	1.03
56	601D566F300FS1	0.625 x 3.125	1461.0	517.0	0.75	1.25
68	601D686F300FT1	0.625 x 3.625	1213.0	430.0	0.87	1.47
22	601D226F300GE1	0.750 x 1.125	4164.0	1471.0	0.32	0.54
47	601D476F300GJ1	0.750 x 1.625	1931.0	683.0	0.54	0.91
68	601D686F300GL1	0.750 x 2.125	1294.0	459.0	0.74	1.24
100	601D107F300GP1	0.750 x 2.625	953.0	338.0	0.94	1.58
120	601D127F300GS1	0.750 x 3.125	795.0	283.0	1.12	1.87
150	601D157F300GT1	0.750 x 3.625	672.0	239.0	1.30	2.17
33	601D336F300HE1	0.875 x 1.125	2712.0	961.0	0.44	0.73
68	601D686F300HJ1	0.875 x 1.625	1296.0	460.0	0.72	1.22
100	601D107F300HL1	0.875 x 2.125	886.0	316.0	0.98	1.64
150	601D157F300HP1	0.875 x 2.625	679.0	242.0	1.22	2.04
180	601D187F300HS1	0.875 x 3.125	519.0	186.0	1.50	2.51
220	601D227F300HT1	0.875 x 3.625	441.0	158.0	1.74	2.91
47	601D476F300JE1	1.000 x 1.125	1973.0	702.0	0.56	0.93
100	601D107F300JJ1	1.000 x 1.625	947.0	338.0	0.92	1.54
150	601D157F300JL1	1.000 x 2.125	637.0	228.0	1.25	2.08
180	601D187F300JP1	1.000 x 2.625	468.0	169.0	1.59	2.64
220	601D227F300JS1	1.000 x 3.125	386.0	139.0	1.88	3.13
270	601D277F300JT1	1.000 x 3.625	318.0	115.0	2.21	3.67

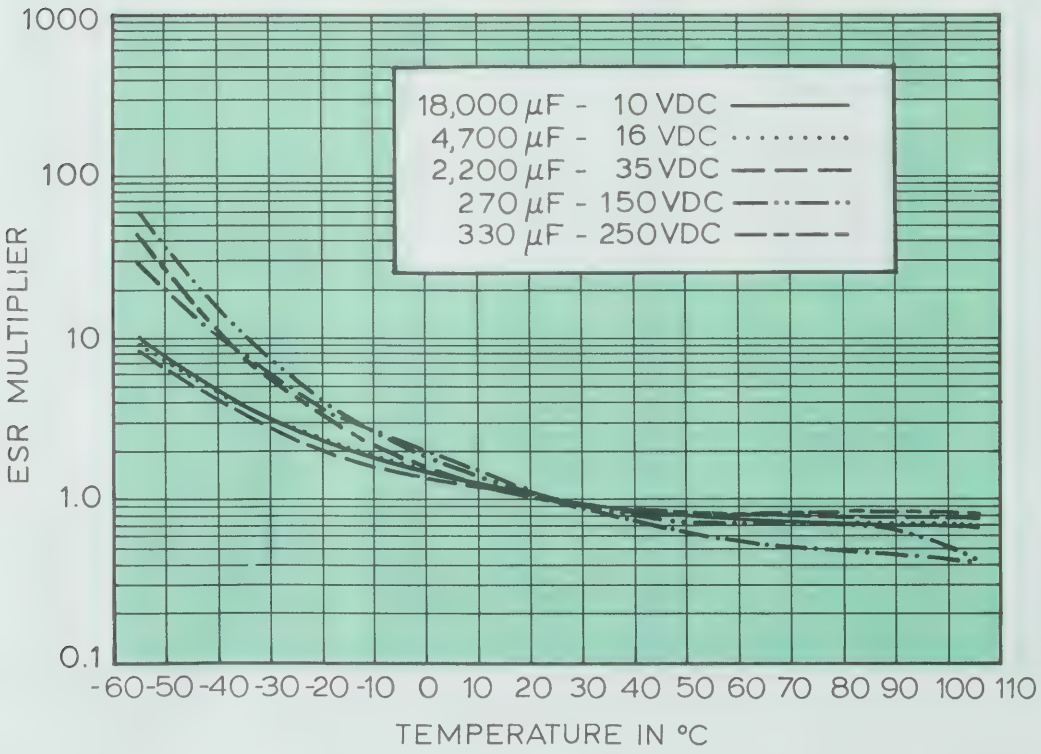
TYPICAL CURVES

TYPE 601D — TYPICAL CAPACITANCE MULTIPLIER
VS. TEMPERATURE @ 120 Hz



Dwg. No. A-14,726

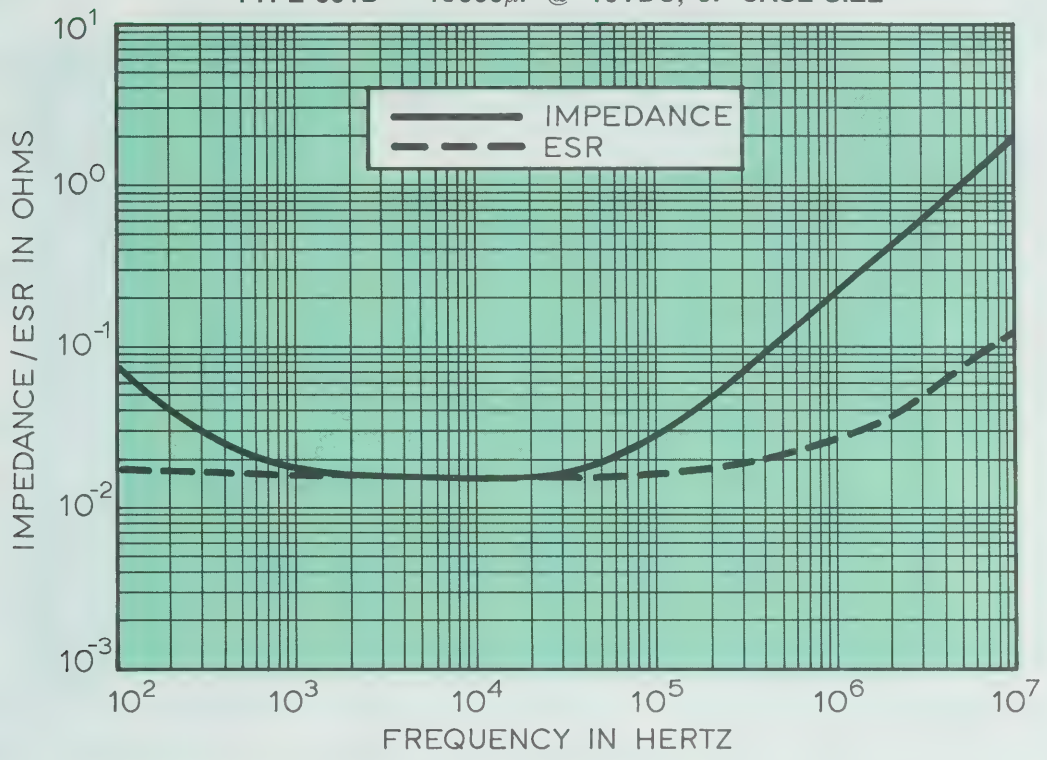
TYPE 601D — TYPICAL ESR MULTIPLIER
VS. TEMPERATURE @ 120 Hz



Dwg. No. A-14,719

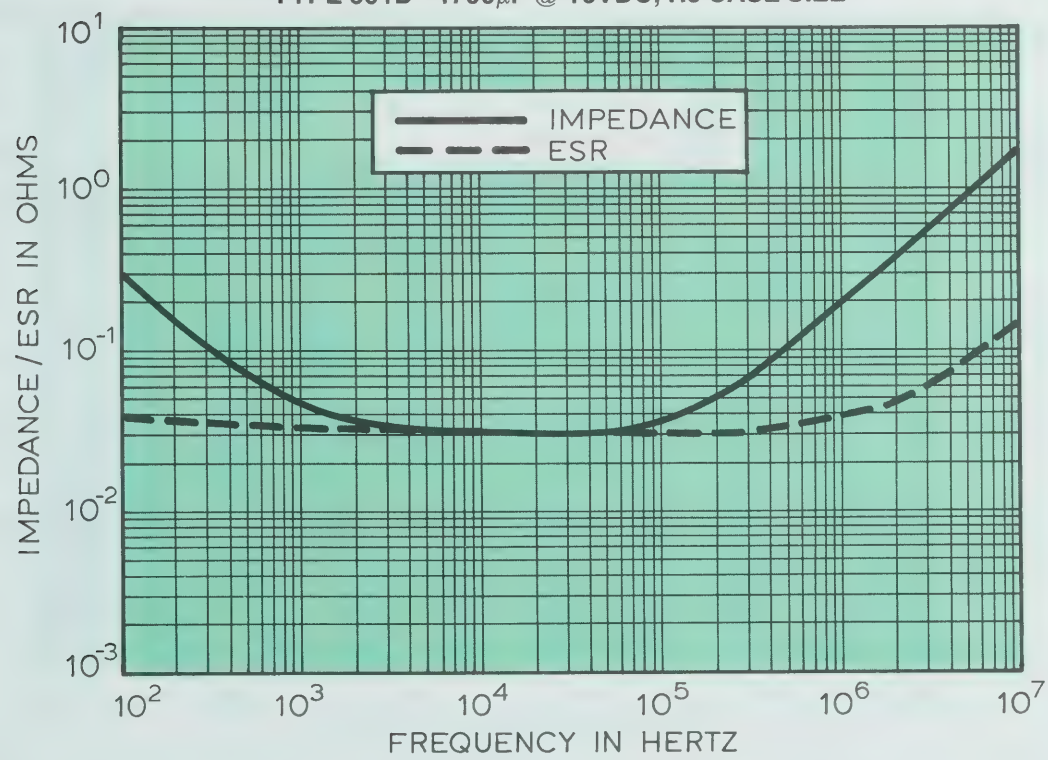
TYPICAL CURVES @ +25°C

TYPE 601D — 18000μF @ 10VDC, JP CASE SIZE



Dwg. No. A-14,663

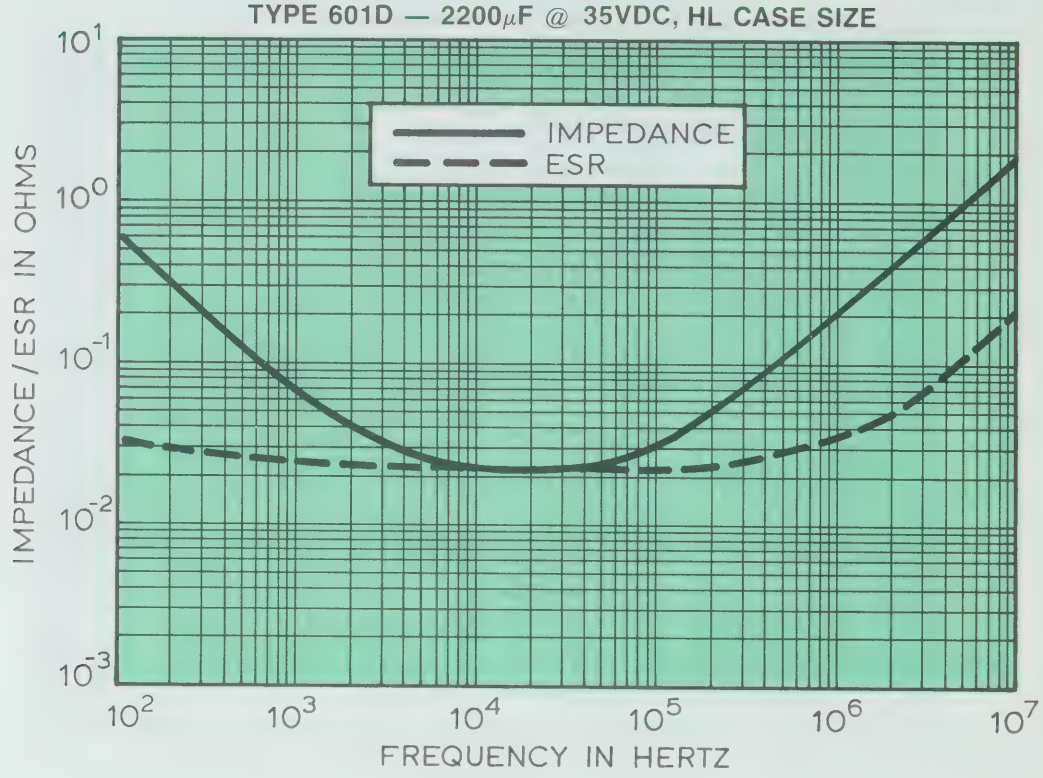
TYPE 601D - 4700μF @ 16VDC, HJ CASE SIZE



Dwg. No. A-14,662

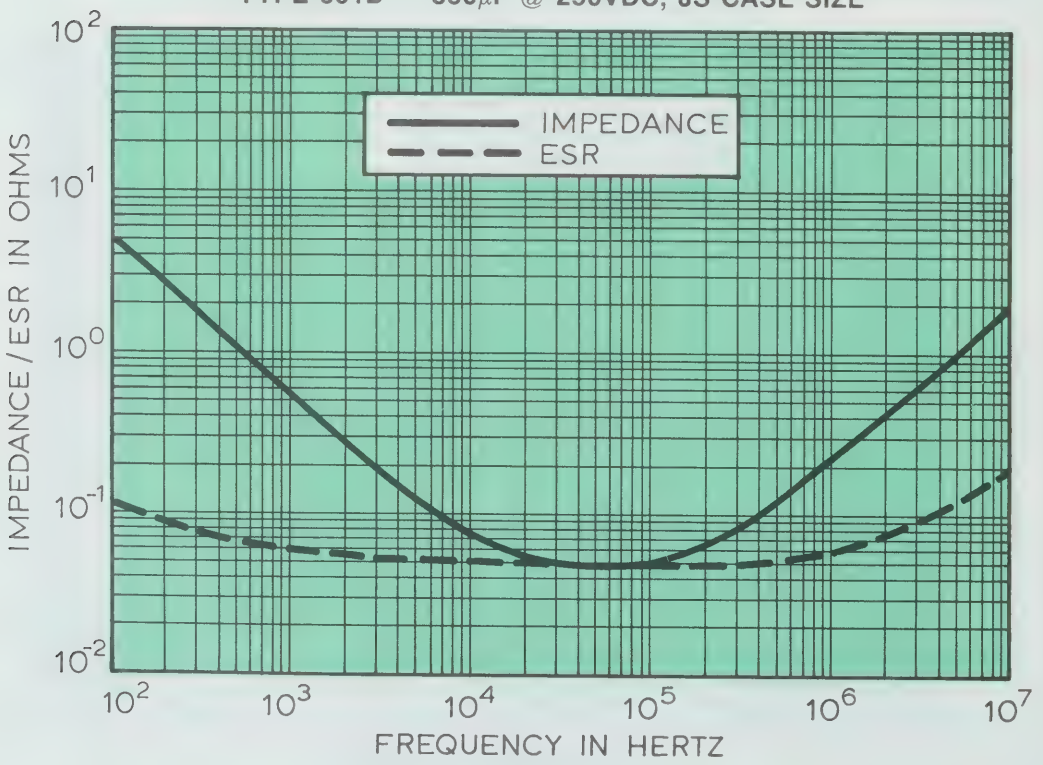
TYPICAL CURVES @ +25°C

TYPE 601D — 2200μF @ 35VDC, HL CASE SIZE



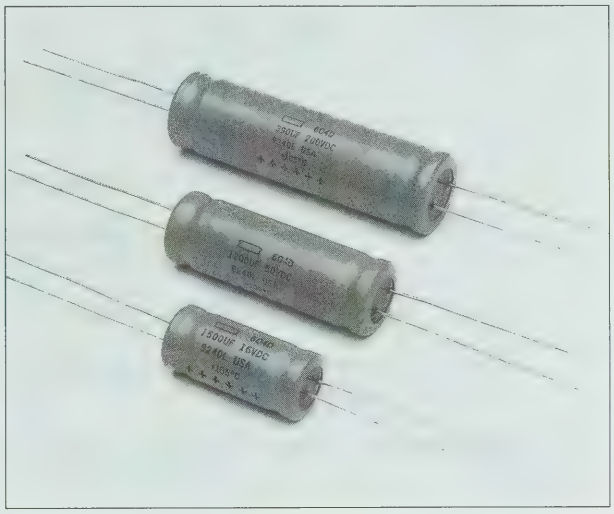
Dwg. No. A-14,661

TYPE 601D — 330μF @ 250VDC, JS CASE SIZE



Dwg. No. A-14,664

+105°C 4-Terminal Tubular Axial Lead Aluminum Capacitors



L65-23

Features —

- 4-Terminal Construction
- Inductance Limit 2nH
- Wide Temperature Range
- Mil Version to Mil-C-39018/07
- Feed Thru Construction

General Specifications —

Operating Temperature:
−55°C to +105°C.

Voltage Range: 5 - 200 VDC.

Capacitance Range: 47μF - 22,000μF.

Capacitance Tolerance: −10, +50%.

Case Size Range: 0.750″ x 1.625″ - 1.000″ x 3.625″

Termination: 4-Terminal, Axial Leads.

Life Validation Test: 2000 hours @ +105°C:
Δ CAP ±15% from initial measurement.
Δ ESR < 1.5x initial specified limit.
Δ DCL < initial specified limit.

Shelf Test: 500 hrs @ +105°C:
C < 10% from initial measurement.
Δ ESR < 1.2x initial specified limit.
Δ DCL < 2.0x initial specified limit.

DC Leakage Current: 5 min. charge time.
$I = k\sqrt{CV}$
k is a constant: 0.5 @ +25°C, 3.0 @ +105°C
C in μF V in Volts I in μA

Ripple Current Multipliers:

Temperature	Multiplier
+105°C	0.45
+85°C	1.0
+75°C	1.18
+65°C	1.34
+25°C	1.84

Low Temperature Performance:
Capacitance Ratio $C^{-55°C}/C^{+25°C}$ min. @ 120Hz

Rated Voltage (VDC)	Capacitance Remaining
5-50	75%
51 up	80%

ESR Ratio $ESR^{-55°C}/ESR^{+25°C}$ max. @ 120Hz

Rated Voltage (VDC)	Multiplier
5-50	12
51 up	18

Performance Characteristics —

SEE PAGE 2.

Catalog Numbering System

604D 272 F 005 GJ 7

- **STYLE NUMBER.** 7 = OUTER INSULATION WITH SUPPLEMENTARY POLYMER COATED END SEALS
- **CASE CODE.** SEE TABLE DIMENSIONS
- **DC VOLTAGE RATING.** EXPRESSED IN VOLTS. "R" IS A DECIMAL POINT. FOR EXAMPLE, 7R5 = 7.5 VOLTS.
- **CAPACITANCE TOLERANCE** F = 10, +50%
- **CAPACITANCE.** EXPRESSED IN MICROFARADS. THE FIRST TWO DIGITS ARE SIGNIFICANT FIGURES, THE THIRD IS THE NUMBER OF ZEROS.
- **TYPE NUMBER.** IDENTIFIES THE BASIC CAPACITOR DESIGN.

TABLE OF DIMENSIONS (inches)

Case Code	Bare Case D ±0.031	Bare Case L ±0.062	Outer Insulation With Polymer Coated End Seals D ±0.031	Outer Insulation With Polymer Coated End Seals L Max.	Lead Spacing S ±.015	Typical Weights Grams	Typical Weights Ounces
GJ	0.750	1.625	0.812	1.843	0.250	18	.635
GL	0.750	2.125	0.812	2.343	0.250	23	.811
GP	0.750	2.625	0.812	2.843	0.250	28	.988
GS	0.750	3.125	0.812	3.343	0.250	33	1.164
GT	0.750	3.625	0.812	3.843	0.250	38	1.340
HJ	0.875	1.625	0.937	1.843	0.300	25	.882
HL	0.875	2.125	0.937	2.343	0.300	31	1.093
HP	0.875	2.625	0.937	2.843	0.300	38	1.340
HS	0.875	3.125	0.937	3.343	0.300	45	1.587
HT	0.875	3.625	0.937	3.843	0.300	52	1.834
JJ	1.000	1.625	1.062	1.843	0.400	32	1.129
JL	1.000	2.125	1.062	2.343	0.400	41	1.446
JP	1.000	2.625	1.062	2.843	0.400	50	1.764
JS	1.000	3.125	1.062	3.343	0.400	59	2.081
JT	1.000	3.625	1.062	3.843	0.400	68	2.399

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size D ± 0.031 x L ± 0.062	Max. ESR @ +25°C, 120Hz (Ω)	Max. Ripple Current @ +85°C, 100kHz 20A Load (A)	Max. Impedance @ +25°C, 100kHz (Ω)
5 VOLTS DC WORKING; 7 VOLTS DC SURGE					
2700	604D272F005GJ7	0.750 x 1.625	0.146	1.50	0.110
3300	604D332F005GL7	0.750 x 2.125	0.106	1.80	0.080
3900	604D392F005HJ7	0.875 x 1.625	0.095	1.90	0.071
4700	604D472F005GP7	0.750 x 2.625	0.080	2.50	0.060
5600	604D562F005HL7	0.875 x 2.125	0.070	2.50	0.053
6800	604D682F005GS7	0.750 x 3.125	0.062	3.10	0.047
6800	604D682F005HP7	0.875 x 2.625	0.052	3.20	0.039
8200	604D822F005JL7	1.000 x 2.125	0.049	3.50	0.037
10000	604D103F005HS7	0.875 x 3.125	0.040	4.00	0.030
15000	604D153F005JP7	1.000 x 2.625	0.035	4.60	0.026
18000	604D183F005JS7	1.000 x 3.125	0.027	5.60	0.020
22000	604D223F005JT7	1.000 x 3.625	0.022	7.00	0.017
7.5 VOLTS DC WORKING; 10 VOLTS DC SURGE					
2200	604D222F7R5GJ7	0.750 x 1.625	0.175	1.40	0.130
3300	604D332F7R5HJ7	0.875 x 1.625	0.117	1.80	0.087
3900	604D392F7R5GP7	0.750 x 2.625	0.093	2.40	0.070
4700	604D472F7R5HL7	0.875 x 2.125	0.080	2.40	0.059
5600	604D562F7R5JJ7	1.000 x 1.625	0.073	2.40	0.055
5600	604D626F7R5GS7	0.750 x 3.125	0.070	3.00	0.053
6200	604D682F7R5HP7	0.875 x 2.625	0.061	3.10	0.046
6800	604D682F7R5JL7	1.000 x 2.125	0.057	3.30	0.043
8200	604D822F7R5HS7	0.875 x 3.125	0.047	3.80	0.035
12000	604D123F7R5JP7	1.000 x 2.625	0.039	4.40	0.029
15000	604D153F7R5JS7	1.000 x 3.125	0.032	5.30	0.024
18000	604D183F7R5JT7	1.000 x 3.625	0.025	6.60	0.019
10 VOLTS DC WORKING; 15 VOLTS DC SURGE					
1800	604D182F010GJ7	0.750 x 1.625	0.195	1.30	0.144
2700	604D272F010GL7	0.750 x 2.125	0.144	1.70	0.107
2700	604D272F010HJ7	0.875 x 1.625	0.127	1.70	0.094
3300	604D332F010GP7	0.750 x 2.625	0.110	2.20	0.082
3900	604D392F010HL7	0.875 x 2.125	0.092	2.20	0.068
4700	604D472F010GS7	0.750 x 3.125	0.081	2.80	0.060
5600	604D562F010HP7	0.875 x 2.625	0.069	2.90	0.051
5600	604D562F010JL7	1.000 x 2.125	0.065	3.20	0.048
6800	604D682F010HS7	0.875 x 3.125	0.053	3.60	0.039
8200	604D822F010JP7	1.000 x 2.625	0.044	4.10	0.033
10000	604D103F010JS7	1.000 x 3.125	0.034	5.00	0.025
15000	604D153F010JT7	1.000 x 3.625	0.028	6.20	0.021
16 VOLTS DC WORKING; 20 VOLTS DC SURGE					
1500	604D152F016GJ7	0.750 x 1.625	0.207	1.20	0.149
2200	604D222F016GL7	0.750 x 2.125	0.153	1.60	0.110
2200	604D222F016HJ7	0.875 x 1.625	0.138	1.60	0.100
3300	604D332F016HL7	0.875 x 2.125	0.107	2.00	0.077
3900	604D392F016GS7	0.750 x 3.125	0.085	2.60	0.061
4700	604D472F016JL7	1.000 x 2.125	0.069	2.90	0.050
5600	604D562F016HS7	0.875 x 3.125	0.056	3.30	0.041
6800	604D682F016JP7	1.000 x 2.625	0.048	3.90	0.035
8200	604D822F016HT7	0.875 x 3.625	0.046	4.10	0.033
10000	604D103F016JS7	1.000 x 3.125	0.036	4.70	0.026
12000	604D123F016JT7	1.000 x 3.625	0.029	5.90	0.021
20 VOLTS DC WORKING; 25 VOLTS DC SURGE					
1200	604D122F020GJ7	0.750 x 1.625	0.240	1.20	0.170
1800	604D182F020HJ7	0.875 x 1.625	0.160	1.50	0.110
2200	604D222F020GP7	0.750 x 2.625	0.132	2.00	0.092
2700	604D272F020HL7	0.875 x 2.125	0.120	1.90	0.084
3300	604D332F020GS7	0.750 x 3.125	0.100	2.50	0.070
3900	604D392F020HP7	0.875 x 2.625	0.085	2.60	0.060
4700	604D472F020JL7	1.000 x 2.125	0.078	2.70	0.055

STANDARD RATINGS

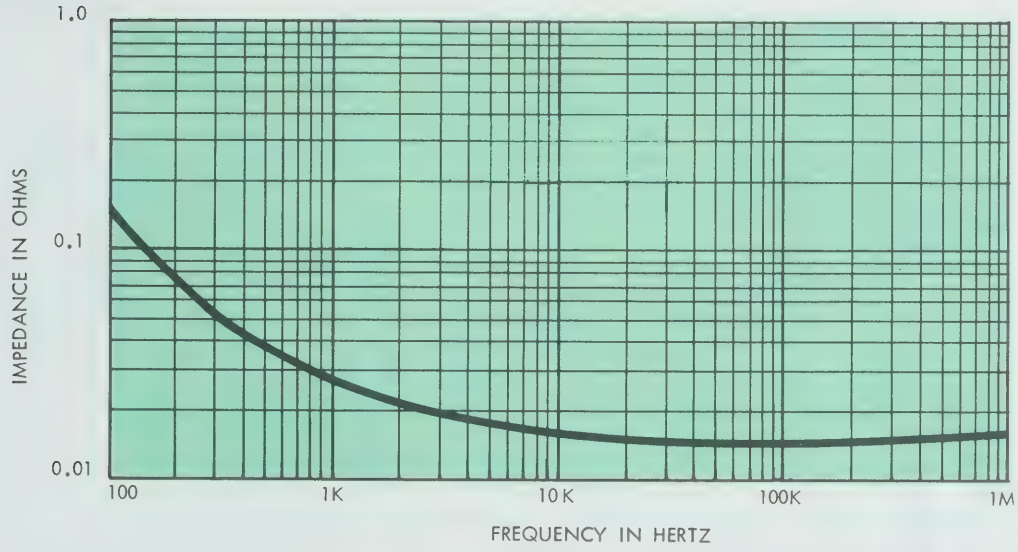
μF	Catalog Number	Nominal Case Size D ± 0.031 x L ± 0.062	Max. ESR @ +25°C, 120Hz (Ω)	Max. Ripple Current @ +85°C, 100kHz 20A Load (A)	Max. Impedance @ +25°C, 100kHz (Ω)
20 VOLTS DC WORKING; 25 VOLTS DC SURGE (Cont.)					
5600	604D562F020HS7	0.875 x 3.125	0.064	3.80	0.045
6800	604D682F020JP7	1.000 x 2.625	0.055	3.50	0.039
8200	604D822F020JS7	1.000 x 3.125	0.042	4.50	0.030
10000	604D103F020JT7	1.000 x 3.625	0.034	5.50	0.024
25 VOLTS DC WORKING; 30 VOLTS DC SURGE					
1000	604D102F025GJ7	0.750 x 1.625	0.320	1.05	0.224
1200	604D122F025GL7	0.750 x 2.125	0.240	1.40	0.168
1800	604D182F025GP7	0.750 x 2.625	0.180	1.75	0.126
2200	604D222F025HL7	0.875 x 2.125	0.145	1.90	0.102
2700	604D272F025JL7	1.000 x 2.125	0.116	2.40	0.081
3300	604D332F025HP7	0.875 x 2.625	0.108	3.00	0.072
4700	604D472F025JP7	1.000 x 2.625	0.080	3.25	0.056
6800	604D682F025JS7	1.000 x 3.125	0.062	4.00	0.043
8200	604D822F025JT7	1.000 x 3.625	0.051	4.65	0.036
30 VOLTS DC WORKING; 40 VOLTS DC SURGE					
820	604D821F030GJ7	0.750 x 1.625	0.380	1.00	0.262
1000	604D102F030GL7	0.750 x 2.125	0.295	1.25	0.204
1500	604D152F030GP7	0.750 x 2.625	0.204	1.70	0.141
1800	604D182F030HL7	0.875 x 2.125	0.165	1.75	0.114
2200	604D222F030JL7	1.000 x 2.125	0.133	2.25	0.092
2700	604D272F030HP7	0.875 x 2.625	0.120	2.35	0.083
3300	604D332F030JP7	1.000 x 2.625	0.095	3.00	0.056
3900	604D392F030HS7	0.875 x 3.125	0.088	2.90	0.061
4700	604D472F030JS7	1.000 x 3.125	0.074	3.60	0.051
5600	604D562F030JT7	1.000 x 3.625	0.059	4.40	0.041
40 VOLTS DC WORKING; 50 VOLTS DC SURGE					
680	604D681F040GJ7	0.750 x 1.625	0.480	0.90	0.322
820	604D821F040GL7	0.750 x 2.125	0.380	1.15	0.255
1000	604D102F040HJ7	0.875 x 1.625	0.295	1.20	0.197
1500	604D152F040HL7	0.875 x 2.125	0.220	1.55	0.147
1800	604D182F040JL7	1.000 x 2.125	0.175	2.05	0.117
2200	604D222F040HP7	0.875 x 2.625	0.155	2.15	0.104
3300	604D332F040HS7	0.875 x 3.125	0.115	2.60	0.077
3900	604D392F040JS7	1.000 x 3.125	0.091	3.40	0.061
4700	604D472F040JT7	1.000 x 3.625	0.074	4.10	0.050
50 VOLTS DC WORKING; 75 VOLTS DC SURGE					
470	604D471F050GJ7	0.750 x 1.625	0.430	0.93	0.280
560	604D561F050GL7	0.750 x 2.125	0.325	1.15	0.212
680	604D681F050HJ7	0.875 x 1.625	0.245	1.25	0.160
820	604D821F050HL7	0.875 x 2.125	0.185	1.60	0.120
1000	604D102F050JL7	1.000 x 2.125	0.150	2.10	0.098
1200	604D122F050HP7	0.875 x 2.625	0.130	2.15	0.085
1500	604D152F050JP7	1.000 x 2.625	0.108	2.80	0.070
2200	604D222F050JS7	1.000 x 3.125	0.081	3.40	0.053
3300	604D332F050JT7	1.000 x 3.625	0.065	4.25	0.042
75 VOLTS DC WORKING; 100 VOLTS DC SURGE					
220	604D221F075GJ7	0.750 x 1.625	0.650	0.78	0.384
270	604D271F075GL7	0.750 x 2.125	0.500	1.00	0.295
390	604D391F075HJ7	0.875 x 1.625	0.370	1.10	0.218
560	604D561F075HL7	0.875 x 2.125	0.290	1.40	0.171
680	604D681F075JL7	1.000 x 2.125	0.230	1.85	0.136
820	604D821F075HP7	0.875 x 2.625	0.200	1.95	0.118
1000	604D102F075HS7	0.875 x 3.125	0.153	2.25	0.090
1500	604D152F075JS7	1.000 x 3.125	0.130	2.95	0.077
1800	604D182F075JT7	1.000 x 3.625	0.100	3.55	0.059

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size D ± 0.031 x L ± 0.062	Max. ESR @ +25°C, 120Hz (Ω)	Max. Ripple Current @ +85°C, 100kHz 20A Load (A)	Max. Impedance @ +25°C, 100kHz (Ω)
100 VOLTS DC WORKING; 125 VOLTS DC SURGE					
150	604D151F100GJ7	0.750 x 1.625	1.000	0.70	0.530
180	604D181F100GL7	0.750 x 2.125	0.765	0.90	0.405
270	604D271F100HJ7	0.875 x 1.625	0.565	0.93	0.300
390	604D391F100HL7	0.875 x 2.125	0.435	1.20	0.230
470	604D471F100JL7	1.000 x 2.215	0.340	1.55	0.180
560	604D561F100HP7	0.875 x 2.625	0.300	1.60	0.159
820	604D821F100JP7	1.000 x 2.625	0.235	2.10	0.125
1000	604D102F100JS7	1.000 x 3.125	0.185	2.65	0.098
1200	604D122F100JT7	1.000 x 3.625	0.150	3.15	0.080
200 VOLTS DC WORKING; 250 VOLTS DC SURGE					
47	604D470F200GJ7	0.750 x 1.625	2.600	0.60	0.780
82	604D820F200GJ7	0.750 x 1.625	1.530	0.75	0.460
120	604D121F200HL7	0.875 x 2.125	1.300	0.95	0.390
180	604D181F200HP7	0.875 x 2.625	0.865	1.25	0.259
220	604D221F200JP7	1.000 x 2.625	0.650	1.67	0.195
270	604D271F200HT7	0.875 x 3.625	0.520	1.90	0.156
390	604D391F200JT7	1.000 x 3.625	0.405	2.50	0.122

TYPICAL CURVE @ +25°C

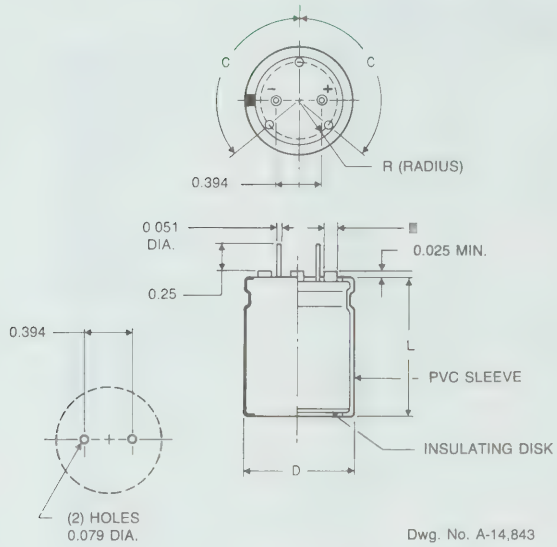
10,000μF, 10 WVDC



Dwg. No. A-9600

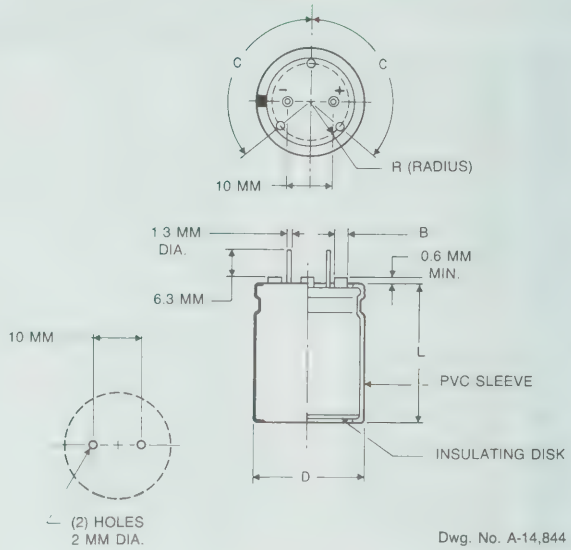
OUTLINE DRAWINGS

STYLE A (INCHES)



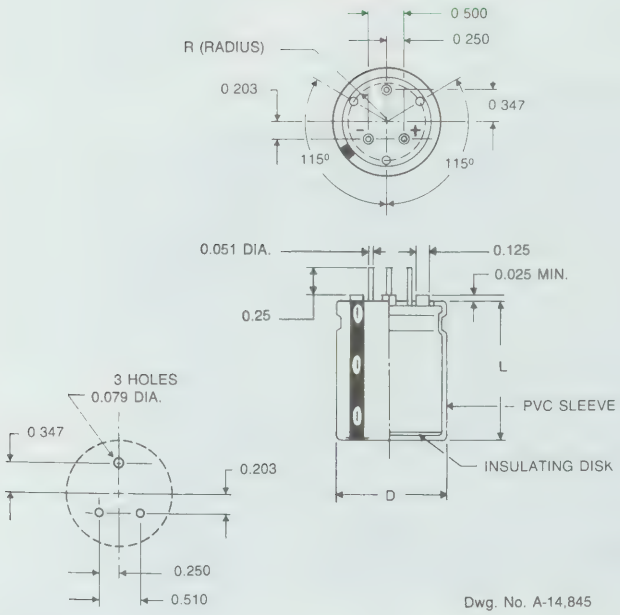
Dwg. No. A-14,843

STYLE A (MILLIMETERS)



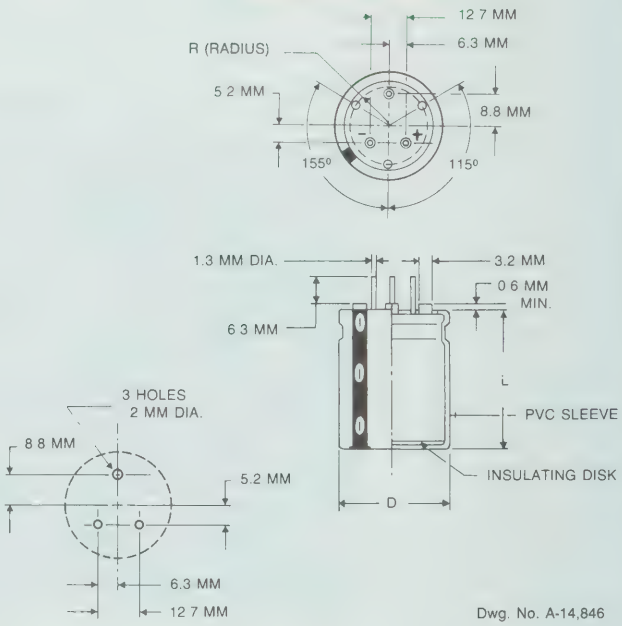
Dwg. No. A-14,844

STYLE B (INCHES)



Dwg. No. A-14,845

STYLE B (MILLIMETERS)



Dwg. No. A-14,846

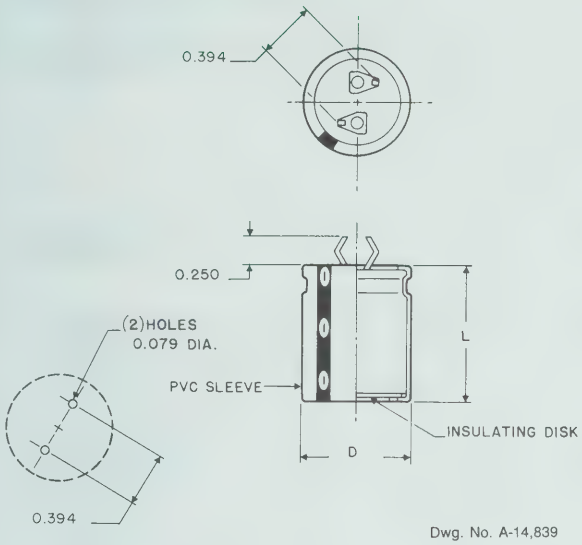
CIRCUIT BOARD MOUNT TERMINAL DIMENSIONS*

DIAMETER			STYLE A DIMENSIONS					STYLE B DIMENSIONS	
D mm	D in.	CODE	B mm	B in.	R mm	R in.	C	R mm	R in.
25	1.00	J	2.4	0.093	7.6	0.301	140	N/A	N/A
30	1.18	K	3.2	0.125	9.2	0.363	120	9.9	0.391
35	1.38	M	3.2	0.125	11.6	0.458	120	11.6	0.458

*Note: Style A & B not available in 22 mm dia. units.

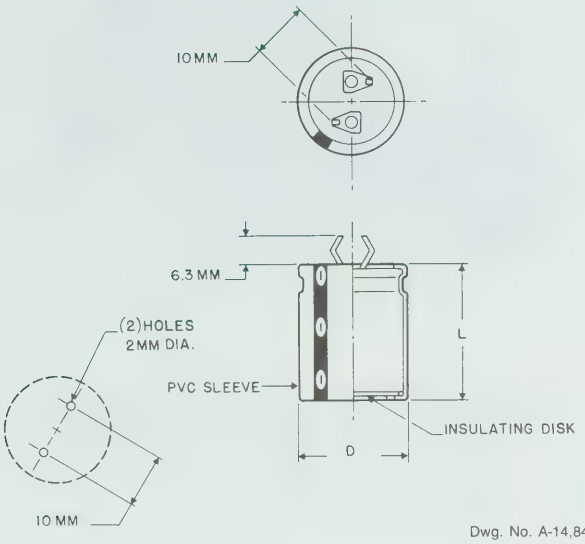
OUTLINE DRAWINGS

STYLE D (INCHES)



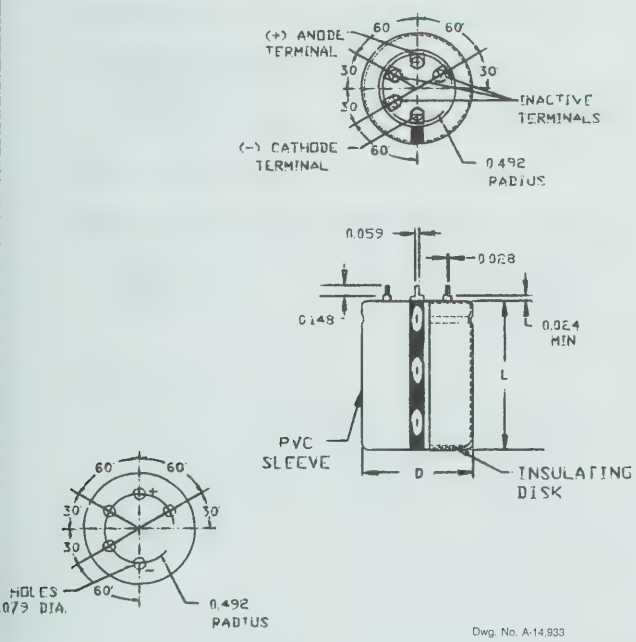
Dwg. No. A-14,839

STYLE D (MILLIMETERS)



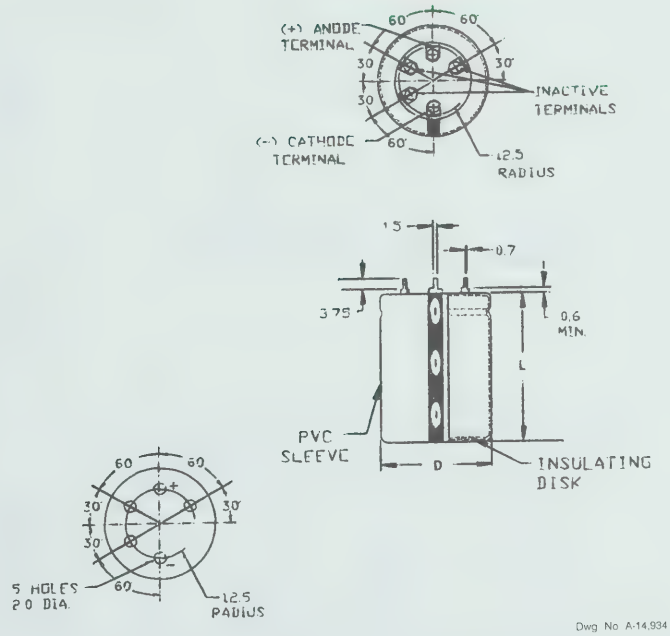
Dwg. No. A-14,840

STYLE F (INCHES)



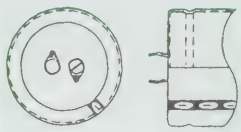
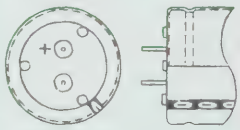
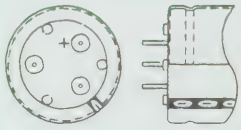
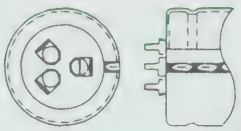
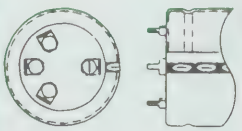
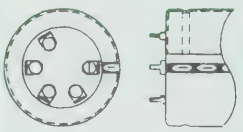
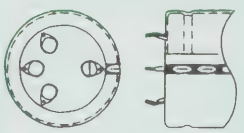
Dwg. No. A-14,933

STYLE F (MILLIMETERS)



Dwg. No. A-14,934

TERMINAL CONFIGURATION

LEAD CODE	DESCRIPTION	OUTLINE DRAWINGS		AVAILABLE DIAMETERS	AVAILABLE VOLTAGES & TYPES
		MOUNTING CONFIGURATION	TERMINAL CONFIGURATION		
D	STANDARD 2 PIN SNAP-IN			22,25,30,35 H, J, K, M	ALL VOLTAGES 81D, 81DA, 82D, 82DA
A	2 STRAIGHT WIRE LEAD MOLDED COVER WITH STANDOFFS			25,30,35 J, K, M	ALL VOLTAGES 82D, 82DA V< =250VDC 81D, 81DA
B	3 STRAIGHT WIRE LEAD MOLDED COVER WITH STANDOFFS			30,35 K, M	ALL VOLTAGES 82D, 82DA V< =250DVC 81D, 81DA
G	3 STRAIGHT STANDOFF PINS			30 K	ALL VOLTAGES 81D, 81DA, 82D, 82DA
H	4 STRAIGHT STANDOFF PINS			35 M	ALL VOLTAGES 81D, 81DA, 82D, 82DA
F	5 STRAIGHT STANDOFF PINS			40 N	ALL VOLTAGES 81D, 81DA, 82D, 82DA
J	4 PIN SNAP-IN			35 M	ALL VOLTAGES 81D, 81DA, 82D, 82DA

Note: For terminal dimensions for Codes G, H, and J, consult United Chemi-Con.

+105°C Snap Mount Aluminum Capacitors

L65-12

Features —

- **Improved Performance**
- **Operating Temperature to +105°C**
- **High Ripple Current Capability**
- **Low ESR**
- **Replaces Type 81D**

General Specifications —

Operating Temperature: −40°C to +105°C.

Voltage Range: 6.3 - 400 VDC.

Capacitance Range: 47μF - 180,000μF.

Capacitance Tolerance: ±20%.

Case Size Range: 22 x 25mm - 35 x 80mm.

Termination: See outline drawings.

Life Validation Test: 2000 hrs @ +105°C:
- Δ CAP ≤ 15% from initial measurement.
- Δ ESR ≤ 1.5x initial specified limit.
- Δ DCL ≤ initial specified limit.

Shelf Test: 500 hrs @ +85°C:
- Δ CAP ≤ 15% from initial measurement.
- Δ ESR ≤ 1.3x initial specified limit.
- Δ DCL ≤ 2x initial specified limit.

DC Leakage Current: 5 min. charge time.
$I = K\sqrt{CV}$
K = 4.0 @ +25°C
I in μa, C in μF, V in Volts

Ripple Current Multipliers:

TEMPERATURE

Ambient Temp.	+55°C	+65°C	+75°C	+85°C	+95°C	+105°C
Multipliers	1.5	1.34	1.2	1.0	.77	.45

FREQUENCY Hz

Rated VDC	50-60	300-1000	Above 1000
0-49	0.85	1.10	1.15
50-199	0.83	1.15	1.20
200-400	0.80	1.30	1.40

Performance Characteristics —

SEE PAGE 2.

Catalog Numbering System

81DA **123** **M** **6R3** **HA** **2** **D**

LEAD CODE. D = 2 PIN SNAP-IN (Standard).
SEE TERMINAL CONFIGURATIONS PAGE 112
FOR LEAD CODE OPTIONS.

CASE STYLE. 2 = PVC INSULATING SLEEVE (Standard).
5 = PVC SLEEVE WITH RESIN END SEAL.
(Required for exposure to halogenated cleaning solvents).

CASE CODE. SEE DIMENSIONS, BELOW.

DC VOLTAGE RATING. EXPRESSED IN VOLTS. AN 'R' INDICATES A DECIMAL POINT, FOR EXAMPLE, 6R3 = 6.3 VOLTS.

CAPACITANCE TOLERANCE. M = ±20%.

CAPACITANCE. EXPRESSED IN MICROFARADS. THE FIRST TWO DIGITS ARE SIGNIFICANT FIGURES, THE THIRD IS THE NUMBER OF ZEROS.

TYPE NUMBER. IDENTIFIES THE BASIC CAPACITOR DESIGN.

DIMENSIONS

CASE CODE	MILLIMETERS DIAMETER D +1/-0	MILLIMETERS LENGTH L ± 2	INCHES DIAMETER D, +0.04/-0	INCHES LENGTH L, ±0.08	STYLE 2 TYPICAL WEIGHT GRAMS
HA	22	25	0.87	1.00	16
HB	22	30	0.87	1.18	19
HD	22	40	0.87	1.57	24
JA	25	25	1.00	1.00	20
JB	25	30	1.00	1.18	24
JC	25	35	1.00	1.38	27
JD	25	40	1.00	1.57	31
JE	25	50	1.00	2.00	38
KA	30	25	1.18	1.00	30
KB	30	30	1.18	1.18	35
KC	30	35	1.18	1.38	39
KD	30	40	1.18	1.57	44
KE	30	50	1.18	2.00	53
MB	35	30	1.38	1.18	48
MC	35	35	1.38	1.38	54
MD	35	40	1.38	1.57	61
ME	35	50	1.38	2.00	74
MF	35	63	1.38	2.50	91
MG	35	80	1.38	3.18	113
NA	40	25	1.58	1.00	48
NB	40	30	1.58	1.18	58
NC	40	35	1.58	1.38	66
ND	40	40	1.58	1.57	81
NE	40	50	1.58	2.00	103
NF	40	63	1.58	2.50	128
NG	40	80	1.58	3.18	183

STANDARD RATINGS

µF	Catalog Number	Nominal Case Size Millimeters D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-40kHz	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-40kHz
6.3 VOLTS DC WORKING; 8 VOLTS SURGE						
12000	81DA123M6R3HA2D	22 x 25	87.0	68.0	3.15	3.57
18000	81DA183M6R3HB2D	22 x 30	68.6	54.7	3.76	4.22
27000	81DA273M6R3HD2D	22 x 40	44.8	35.9	5.19	5.80
18000	81DA183M6R3JA2D	25 x 25	70.6	56.8	3.83	4.20
27000	81DA273M6R3JB2D	25 x 30	53.7	43.3	4.65	5.18
33000	81DA333M6R3JC2D	25 x 35	43.7	35.3	5.46	6.28
39000	81DA393M6R3JD2D	25 x 40	35.5	28.8	6.35	7.05
56000	81DA563M6R3JE2D	25 x 50	28.2	22.9	7.83	8.69
27000	81DA273M6R3KA2D	30 x 25	57.8	47.3	4.74	5.24
39000	81DA393M6R3KB2D	30 x 30	44.2	36.2	5.70	6.30
47000	81DA473M6R3KC2D	30 x 35	36.2	29.8	6.67	7.35
68000	81DA683M6R3KD2D	30 x 40	29.6	24.4	7.72	8.50
82000	81DA823M6R3KE2D	30 x 50	23.7	19.6	9.45	10.39
56000	81DA563M6R3MB2D	35 x 30	26.5	21.4	8.21	9.14
68000	81DA683M6R3MC2D	35 x 35	21.6	17.5	9.57	10.63
82000	81DA823M6R3MD2D	35 x 40	17.6	14.2	11.08	12.33
120000	81DA124M6R3ME2D	35 x 50	13.9	11.4	12.20	13.60
150000	81DA154M6R3MF2D	35 x 63	11.2	9.2	15.30	16.23
180000	81DA184M6R3MG2D	35 x 80	9.1	7.5	18.10	20.10
56000	81DA563M6R3NA2F	40 x 25	28.8	23.6	8.23	9.09
82000	81DA823M6R3NB2F	40 x 30	22.0	18.1	9.88	10.89
100000	81DA104M6R3NC2F	40 x 35	18.0	14.8	10.25	11.30
120000	81DA124M6R3ND2F	40 x 40	14.7	12.1	11.83	12.99
180000	81DA184M6R3NE2F	40 x 50	11.8	9.8	14.36	15.76
220000	81DA224M6R3NF2F	40 x 63	9.6	8.0	17.24	18.88
270000	81DA274M6R3NG2F	40 x 80	7.9	6.6	20.86	22.82
10 VOLTS DC WORKING; 12 VOLTS SURGE						
10000	81DA103M010HA2D	22 x 25	92.0	70.0	3.07	3.52
12000	81DA123M010HB2D	22 x 30	71.7	55.8	3.68	4.17
22000	81DA223M010HD2D	22 x 40	46.7	36.5	5.08	5.75
15000	81DA153M010JA2D	25 x 25	73.5	57.0	3.76	4.86
18000	81DA183M010JB2D	25 x 30	55.8	43.9	4.57	5.69
22000	81DA223M010JC2D	25 x 35	45.4	35.9	5.35	6.68
27000	81DA273M010JD2D	25 x 40	36.8	29.2	6.24	7.00
39000	81DA393M010JE2D	25 x 50	29.2	23.2	7.70	8.64
22000	81DA223M010KA2D	30 x 25	59.5	47.7	4.67	5.22
27000	81DA273M010KB2D	30 x 30	45.4	36.5	5.63	6.28
39000	81DA393M010KC2D	30 x 35	37.2	30.0	6.58	7.32
47000	81DA473M010KD2D	30 x 40	30.4	24.6	7.62	8.47
56000	81DA563M010KE2D	30 x 50	24.3	19.7	9.33	10.36
39000	81DA393M010MB2D	35 x 30	27.6	21.7	8.05	9.07
47000	81DA473M010MC2D	35 x 35	22.4	17.7	9.40	10.57
56000	81DA563M010MD2D	35 x 40	18.2	14.4	10.90	12.25
82000	81DA823M010ME2D	35 x 50	14.4	11.5	12.10	13.70
100000	81DA104M010MF2D	35 x 63	11.6	9.3	14.90	16.90
150000	81DA154M010MG2D	35 x 80	9.4	7.6	18.10	19.90
47000	81DA473M010NA2F	40 x 25	29.6	23.7	8.12	9.07
56000	81DA563M010NB2F	40 x 30	22.6	18.2	9.74	10.86
68000	81DA683M010NC2F	40 x 35	18.5	14.9	10.11	11.27
82000	81DA823M010ND2F	40 x 40	15.1	12.2	11.67	12.99
120000	81DA124M010NE2F	40 x 50	12.1	9.8	14.18	15.76
150000	81DA154M010NF2F	40 x 63	9.8	8.0	17.06	18.88
220000	81DA224M010NG2F	40 x 80	8.0	6.6	20.73	22.82

STANDARD RATINGS

µF	Catalog Number	Nominal Case Size Millimeters D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-40kHz	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-40kHz
16 VOLTS DC WORKING; 20 VOLTS SURGE						
5600	81DA562M016HA2D	22 x 25	96.0	71.0	2.92	3.39
10000	81DA103M016HB2D	22 x 30	76.4	56.8	3.57	4.14
15000	81DA153M016HD2D	22 x 40	49.6	37.1	4.93	5.70
8200	81DA822M016JA2D	25 x 25	77.0	58.0	3.65	4.83
12000	81DA123M016JB2D	25 x 30	58.9	44.5	4.44	5.66
15000	81DA153M016JC2D	25 x 35	47.9	36.3	5.21	6.64
22000	81DA223M016JD2D	25 x 40	38.7	29.5	6.08	6.97
27000	81DA273M016JE2D	25 x 50	30.6	23.5	7.52	8.58
12000	81DA123M016KA2D	30 x 25	62.1	48.0	4.57	5.20
22000	81DA223M016KB2D	30 x 30	47.4	36.8	5.51	6.25
27000	81DA273M016KC2D	30 x 35	38.7	30.2	6.45	7.30
33000	81DA333M016KD2D	30 x 40	31.6	24.7	7.47	8.45
39000	81DA393M016KE2D	30 x 50	25.2	19.9	9.16	10.31
27000	81DA273M016MB2D	35 x 30	29.1	22.0	7.84	9.01
33000	81DA333M016MC2D	35 x 35	23.7	18.0	9.14	10.48
47000	81DA473M016MD2D	35 x 40	19.2	14.6	10.61	12.16
56000	81DA563M016ME2D	35 x 50	15.1	11.6	12.00	13.80
68000	81DA683M016MF2D	35 x 63	12.1	9.4	14.40	16.90
100000	81DA104M016MG2D	35 x 80	9.8	7.6	18.00	19.90
27000	81DA273M016NA2F	40 x 25	30.9	23.9	7.94	9.03
33000	81DA333M016NB2F	40 x 30	23.6	18.3	9.53	10.83
47000	81DA473M016NC2F	40 x 35	19.3	15.0	9.90	11.23
56000	81DA563M016ND2F	40 x 40	15.7	12.3	11.45	12.93
68000	81DA683M016NE2F	40 x 50	12.5	9.9	13.95	15.68
100000	81DA104M016NF2F	40 x 63	10.2	8.1	16.72	18.76
120000	81DA124M016NG2F	40 x 80	8.3	6.7	20.35	22.65
25 VOLTS DC WORKING; 30 VOLTS SURGE						
3900	81DA392M025HA2D	22 x 25	98.4	72.6	2.96	3.39
5600	81DA562M025HB2D	22 x 30	74.2	55.0	3.62	4.14
8200	81DA822M025HD2D	22 x 40	48.2	36.0	5.00	5.74
5600	81DA562M025JA2D	25 x 25	79.5	60.0	3.61	4.83
8200	81DA822M025JB2D	25 x 30	60.2	45.6	4.40	5.66
10000	81DA103M025JC2D	25 x 35	48.9	37.2	5.16	6.64
12000	81DA123M025JD2D	25 x 40	39.6	30.2	6.01	7.02
15000	81DA153M025JE2D	25 x 50	31.2	24.0	7.45	8.58
8200	81DA822M025KA2D	30 x 25	68.0	54.0	4.37	5.20
12000	81DA123M025KB2D	30 x 30	51.7	41.0	5.27	6.25
15000	81DA153M025KC2D	30 x 35	42.2	33.0	6.17	7.30
18000	81DA183M025KD2D	30 x 40	34.3	27.0	7.17	8.45
27000	81DA273M025KE2D	30 x 50	27.3	22.0	8.80	10.31
15000	81DA153M025MB2D	35 x 30	29.9	22.7	7.73	9.01
18000	81DA183M025MC2D	35 x 35	24.3	18.5	9.02	10.48
27000	81DA273M025MD2D	35 x 40	19.7	15.0	10.47	12.16
33000	81DA333M025ME2D	35 x 50	15.5	12.0	12.00	13.90
47000	81DA473M025MF2D	35 x 63	12.4	9.6	15.00	17.70
56000	81DA563M025MG2D	35 x 80	10.0	7.8	18.00	19.90
18000	81DA183M025NA2F	40 x 25	34.1	27.1	7.56	9.03
22000	81DA223M025NB2F	40 x 30	25.9	20.7	9.10	10.83
27000	81DA273M025NC2F	40 x 35	21.1	16.9	9.47	11.23
39000	81DA393M025ND2F	40 x 40	17.2	13.8	10.94	12.93
47000	81DA473M025NE2F	40 x 50	13.6	11.0	13.37	15.68
68000	81DA683M025NF2F	40 x 63	11.0	8.9	16.10	18.76
82000	81DA823M025NG2F	40 x 80	8.9	7.3	19.65	22.65

STANDARD RATINGS

µF	Catalog Number	Nominal Case Size Millimeters D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-40kHz	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-40kHz
35 VOLTS DC WORKING; 40 VOLTS SURGE						
3300	81DA332M035HA2D	22 x 25	103.8	73.1	2.88	3.44
3900	81DA392M035HB2D	22 x 30	78.2	55.3	3.52	4.19
6800	81DA682M035HD2D	22 x 40	50.7	36.3	4.88	5.77
4700	81DA472M035JA2D	25 x 25	83.3	60.3	3.53	4.76
5600	81DA562M035JB2D	25 x 30	63.0	45.8	4.30	5.58
6800	81DA682M035JC2D	25 x 35	51.1	37.4	5.05	6.54
10000	81DA103M035JD2D	25 x 40	41.3	30.0	5.89	7.19
12000	81DA123M035JE2D	25 x 50	32.6	24.0	7.29	8.47
6800	81DA682M035KA2D	30 x 25	70.3	54.0	4.30	4.89
10000	81DA103M035KB2D	30 x 30	53.4	41.0	5.19	5.94
12000	81DA123M035KC2D	30 x 35	43.5	33.0	6.08	7.05
15000	81DA153M035KD2D	30 x 40	35.3	27.0	7.07	8.16
18000	81DA183M035KE2D	30 x 50	28.1	22.0	8.68	9.81
12000	81DA123M035MB2D	35 x 30	31.3	22.8	7.56	8.85
15000	81DA153M035MC2D	35 x 35	25.4	18.6	8.82	10.31
18000	81DA183M035MD2D	35 x 40	20.5	15.1	10.27	11.96
27000	81DA273M035ME2D	35 x 50	16.2	12.0	11.50	13.90
33000	81DA333M035MF2D	35 x 63	12.9	9.7	14.50	17.70
47000	81DA473M035MG2D	35 x 80	10.3	7.8	17.30	19.90
12000	81DA123M035NA2F	40 x 25	35.2	27.0	7.44	8.50
18000	81DA183M035NB2F	40 x 30	26.8	20.6	8.95	10.21
22000	81DA223M035NC2F	40 x 35	21.8	16.9	9.31	10.58
27000	81DA273M035ND2F	40 x 40	17.7	13.8	10.78	12.21
39000	81DA393M035NE2F	40 x 50	14.1	11.0	13.13	14.87
47000	81DA473M035NF2F	40 x 63	11.3	8.9	15.89	17.90
68000	81DA683M035NG2F	40 x 80	9.1	7.3	19.43	21.70
50 VOLTS DC WORKING; 63 VOLTS SURGE						
1800	81DA182M050HA2D	22 x 25	119.0	73.9	2.69	3.42
2700	81DA272M050HB2D	22 x 30	89.4	55.9	3.30	4.17
3900	81DA392M050HD2D	22 x 40	57.7	36.6	4.57	5.74
2700	81DA272M050JA2D	25 x 25	93.9	60.7	3.32	4.74
3300	81DA332M050JB2D	25 x 30	70.9	46.2	4.05	5.56
4700	81DA472M050JC2D	25 x 35	57.4	37.6	4.76	6.52
5600	81DA562M050JD2D	25 x 40	46.2	30.6	5.57	7.02
6800	81DA682M050JE2D	25 x 50	36.3	24.0	6.90	8.44
3900	81DA392M050KA2D	30 x 25	77.0	54.0	4.11	4.90
5600	81DA562M050KB2D	30 x 30	58.4	41.0	4.96	5.94
6800	81DA682M050KC2D	30 x 35	47.5	33.0	5.82	7.05
8200	81DA822M050KD2D	30 x 40	38.4	27.5	6.78	8.01
12000	81DA123M050KE2D	30 x 50	30.4	22.0	8.34	9.81
6800	81DA682M050MB2D	35 x 30	35.2	23.0	7.12	8.81
8200	81DA822M050MC2D	35 x 35	28.5	18.7	8.33	10.28
12000	81DA123M050MD2D	35 x 40	23.0	15.2	9.69	11.92
15000	81DA153M050ME2D	35 x 50	18.0	12.1	10.76	13.97
18000	81DA183M050MF2D	35 x 63	14.3	9.7	13.48	17.33
27000	81DA273M050MG2D	35 x 80	11.4	7.9	16.14	19.98
8200	81DA822M050NA2F	40 x 25	38.6	27.0	7.11	8.50
10000	81DA103M050NB2F	40 x 30	29.3	20.6	8.56	10.21
12000	81DA123M050NC2F	40 x 35	23.8	16.8	8.91	10.61
18000	81DA183M050ND2F	40 x 40	19.3	13.7	10.32	12.26
22000	81DA223M050NE2F	40 x 50	15.2	11.0	12.65	14.87
27000	81DA273M050NF2F	40 x 63	12.2	8.9	15.29	17.90
39000	81DA393M050NG2F	40 x 80	9.8	7.3	18.73	21.70

STANDARD RATINGS

µF	Catalog Number	Nominal Case Size Millimeters D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-40kHz	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-40kHz
63 VOLTS DC WORKING; 79 VOLTS SURGE						
1500	81DA152M063HA2D	22 x 25	128.4	71.7	2.59	3.47
1800	81DA182M063HB2D	22 x 30	96.4	54.3	3.74	4.23
2700	81DA272M063HD2D	22 x 40	62.0	35.6	4.41	5.82
1800	81DA182M063JA2D	25 x 25	102.5	60.2	3.18	4.76
2700	81DA272M063JB2D	25 x 30	77.2	45.8	3.88	5.58
3300	81DA332M063JC2D	25 x 35	62.4	37.3	4.57	6.55
3900	81DA392M063JD2D	25 x 40	50.1	30.0	5.35	7.19
5600	81DA562M063JE2D	25 x 50	39.2	24.0	6.64	8.47
2700	81DA272M063KA2D	30 x 25	83.2	54.0	3.95	4.86
3900	81DA392M063KB2D	30 x 30	62.9	41.0	4.78	5.95
4700	81DA472M063KC2D	30 x 35	51.1	33.0	5.61	7.05
6800	81DA682M063KD2D	30 x 40	41.2	27.0	6.54	8.16
8200	81DA822M063KE2D	30 x 50	32.5	22.0	8.07	9.75
5600	81DA562M063MB2D	35 x 30	38.1	22.7	6.85	8.87
6800	81DA682M063MC2D	35 x 35	30.8	18.5	8.01	10.34
8200	81DA822M063MD2D	35 x 40	24.8	15.0	9.33	12.00
12000	81DA123M063ME2D	35 x 50	19.4	12.0	10.52	13.97
15000	81DA153M063MF2D	35 x 63	15.3	9.6	13.10	17.42
18000	81DA183M063MG2D	35 x 80	12.1	7.8	18.05	19.98
5600	81DA562M063NA2F	40 x 25	41.7	27.5	6.84	8.42
8200	81DA822M063NB2F	40 x 30	31.5	20.9	8.25	10.13
10000	81DA103M063NC2F	40 x 35	25.6	17.1	8.59	10.52
12000	81DA123M063ND2F	40 x 40	20.7	14.0	9.97	12.12
18000	81DA183M063NE2F	40 x 50	16.3	11.1	12.22	14.80
22000	81DA223M063NF2F	40 x 63	13.0	9.0	14.81	17.80
27000	81DA273M063NG2F	40 x 80	10.4	7.3	18.18	21.70
100 VOLTS DC WORKING; 125 VOLTS SURGE						
560	81DA561M100HA2D	22 x 25	272.3	136.1	1.78	2.52
680	81DA681M100HB2D	22 x 30	202.7	101.9	2.19	3.09
1200	81DA122M100HD2D	22 x 40	128.2	65.2	3.07	4.30
820	81DA821M100JA2D	25 x 25	206.8	106.9	2.24	3.59
1000	81DA102M100JB2D	25 x 30	154.3	80.3	2.74	4.24
1200	81DA122M100JC2D	25 x 35	123.5	64.7	3.24	5.01
1500	81DA152M100JD2D	25 x 40	98.0	51.8	3.82	5.26
2200	81DA222M100JE2D	25 x 50	75.4	40.3	4.79	6.55
1200	81DA122M100KA2D	30 x 25	150.3	83.7	2.94	3.94
1500	81DA152M100KB2D	30 x 30	112.6	63.2	3.57	4.77
1800	81DA182M100KC2D	30 x 35	90.4	51.1	4.22	5.61
2200	81DA222M100KD2D	30 x 40	72.1	41.1	4.95	6.55
3300	81DA332M100KE2D	30 x 50	55.8	32.3	6.16	8.09
2200	81DA222M100MB2D	35 x 30	75.9	39.6	4.85	6.72
2700	81DA272M100MC2D	35 x 35	60.8	31.9	5.70	7.87
3300	81DA332M100MD2D	35 x 40	48.2	25.5	6.69	9.20
3900	81DA392M100ME2D	35 x 50	37.1	19.9	7.44	10.72
5600	81DA562M100MF2D	35 x 63	28.7	15.6	9.19	13.54
8200	81DA822M100MG2D	35 x 80	22.1	12.3	11.53	16.40
2200	81DA222M100NA2F	40 x 25	75.5	42.0	5.08	6.81
3300	81DA332M100NB2F	40 x 30	56.6	31.7	6.16	8.23
3900	81DA392M100NC2F	40 x 35	45.4	25.6	6.45	8.59
4700	81DA472M100ND2F	40 x 40	36.2	20.6	7.54	9.99
6800	81DA682M100NE2F	40 x 50	28.0	16.2	9.32	12.25
8200	81DA822M100NF2F	40 x 63	21.8	12.8	11.44	14.93
12000	81DA123M100NG2F	40 x 80	17.0	10.2	14.22	18.36

STANDARD RATINGS

µF	Catalog Number	Nominal Case Size Millimeters D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-40kHz	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-40kHz
160 VOLTS DC WORKING; 200 VOLTS SURGE						
220	81DA221M160HA2D	22 x 25	656.4	338.5	1.22	1.70
330	81DA331M160HB2D	22 x 30	486.7	251.5	1.50	2.09
470	81DA471M160HD2D	22 x 40	304.6	158.2	2.12	2.94
330	81DA331M160JA2D	25 x 25	470.1	246.7	1.58	2.18
470	81DA471M160JB2D	25 x 30	348.9	183.6	1.94	2.68
560	81DA561M160JC2D	25 x 35	277.9	146.6	2.30	3.17
680	81DA681M160JD2D	25 x 40	219.0	116.0	2.72	3.74
1000	81DA102M160JE2D	25 x 50	166.8	88.8	3.43	4.70
560	81DA561M160KA2D	30 x 25	330.1	179.7	2.11	2.86
680	81DA681M160KB2D	30 x 30	245.4	134.1	2.58	3.48
820	81DA821M160KC2D	30 x 35	195.8	107.4	3.05	4.12
1000	81DA102M160KD2D	30 x 40	154.7	85.2	3.59	4.84
1500	81DA152M160KE2D	30 x 50	118.2	65.6	4.50	6.05
1000	81DA102M160MB2D	35 x 30	196.7	112.4	3.21	4.24
1200	81DA122M160MC2D	35 x 35	157.2	90.2	3.77	4.98
1500	81DA152M160MD2D	35 x 40	124.4	71.7	4.43	5.84
1800	81DA182M160ME2D	35 x 50	95.3	55.4	5.15	6.65
2700	81DA272M160MF2D	35 x 63	73.2	42.9	6.12	8.00
3300	81DA332M160MG2D	35 x 80	56.1	33.3	8.07	10.30
1000	81DA102M160NA2F	40 x 25	163.4	89.1	3.68	4.98
1500	81DA152M160NB2F	40 x 30	121.5	66.5	4.47	6.05
1800	81DA182M160NC2F	40 x 35	97.0	53.3	4.70	6.34
2200	81DA222M160ND2F	40 x 40	76.6	42.3	5.52	7.42
2700	81DA272M160NE2F	40 x 50	58.5	32.5	6.86	9.21
3900	81DA392M160NF2F	40 x 63	44.8	25.1	8.49	11.35
5600	81DA562M160NG2F	40 x 80	34.2	19.4	10.67	14.17
200 VOLTS DC WORKING; 250 VOLTS SURGE						
180	81DA181M200HA2D	22 x 25	754.0	340.0	1.14	1.69
220	81DA221M200HB2D	22 x 30	558.8	252.6	1.40	2.09
390	81DA391M200HD2D	22 x 40	349.5	158.9	1.98	2.93
270	81DA271M200JA2D	25 x 25	538.2	247.7	1.48	2.18
330	81DA331M200JB2D	25 x 30	399.3	184.4	1.81	2.67
390	81DA391M200JC2D	25 x 35	317.8	147.2	2.15	3.16
560	81DA561M200JD2D	25 x 40	250.3	116.5	2.54	3.81
680	81DA681M200JE2D	25 x 50	190.4	89.2	3.21	4.69
390	81DA391M200KA2D	30 x 25	375.1	180.4	1.98	2.85
560	81DA561M200KB2D	30 x 30	278.7	134.6	2.42	3.51
680	81DA681M200KC2D	30 x 35	222.2	107.0	2.86	4.18
820	81DA821M200KD2D	30 x 40	175.4	85.5	3.37	4.84
1000	81DA102M200KE2D	30 x 50	133.8	65.8	4.23	6.04
680	81DA681M200MB2D	35 x 30	221.3	112.7	3.02	4.24
820	81DA821M200MC2D	35 x 35	176.7	90.4	3.56	4.98
1200	81DA122M200MD2D	35 x 40	139.7	71.9	4.18	5.83
1500	81DA152M200ME2D	35 x 50	106.9	55.5	5.01	7.07
1800	81DA182M200MF2D	35 x 63	81.9	43.1	6.37	8.93
2700	81DA272M200MG2D	35 x 80	62.6	33.4	7.88	10.70
820	81DA821M200NA2F	40 x 25	185.7	89.4	3.45	4.97
1000	81DA102M200NB2F	40 x 30	138.0	66.7	4.20	6.04
1200	81DA122M200NC2F	40 x 35	110.0	53.4	4.41	6.33
1800	81DA182M200ND2F	40 x 40	86.8	42.4	5.18	7.41
2200	81DA222M200NE2F	40 x 50	66.2	32.6	6.45	9.19
2700	81DA272M200NF2F	40 x 63	50.6	25.2	7.99	11.32
3900	81DA392M200NG2F	40 x 80	38.5	19.5	10.06	14.13

STANDARD RATINGS

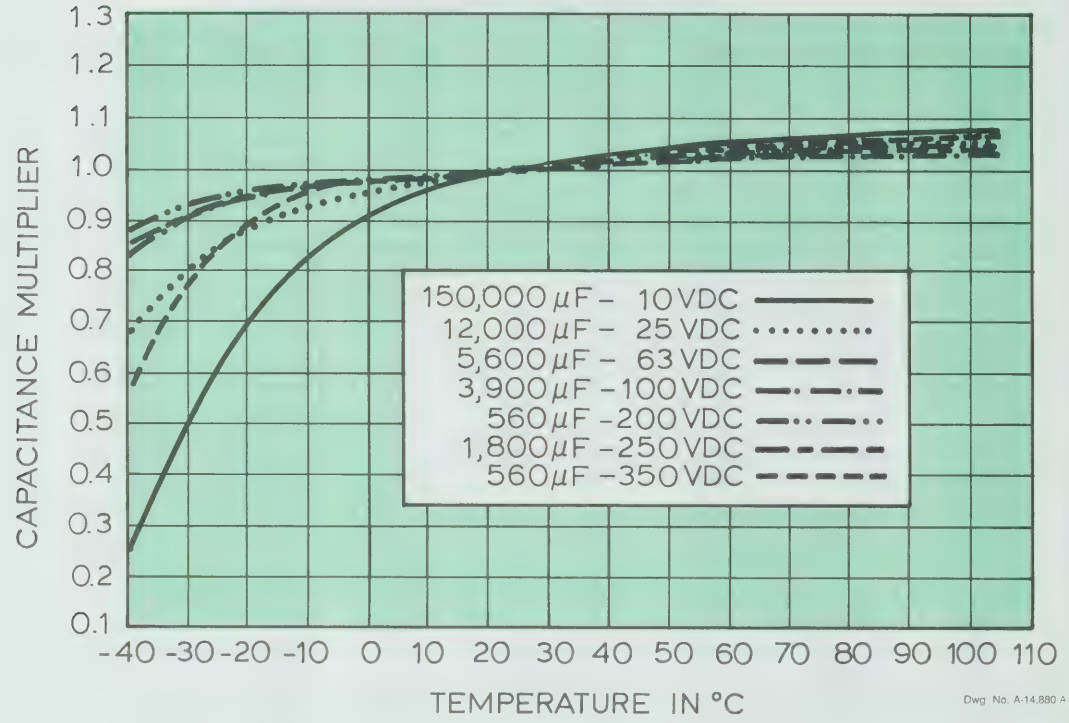
µF	Catalog Number	Nominal Case Size Millimeters D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-40kHz	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-40kHz
250 VOLTS DC WORKING; 300 VOLTS SURGE						
120	81DA121M250HA2D	22 x 25	883.4	385.0	1.05	1.69
180	81DA181M250HB2D	22 x 30	654.4	253.6	1.29	2.08
270	81DA271M250HD2D	22 x 40	408.9	159.5	1.83	2.93
180	81DA181M250JA2D	25 x 25	628.5	248.6	1.37	2.17
270	81DA271M250JB2D	25 x 30	466.0	185.0	1.68	2.67
330	81DA331M250JC2D	25 x 35	370.7	147.8	1.99	3.16
390	81DA391M250JD2D	25 x 40	291.8	116.9	2.36	3.81
560	81DA561M250JE2D	25 x 50	221.7	89.5	2.97	4.68
270	81DA271M250KA2D	30 x 25	434.9	180.9	1.84	2.85
390	81DA391M250KB2D	30 x 30	322.9	135.0	2.24	3.52
470	81DA471M250KC2D	30 x 35	257.3	108.1	2.66	4.12
560	81DA561M250KD2D	30 x 40	202.9	85.8	3.14	4.83
820	81DA821M250KE2D	30 x 50	154.6	66.0	3.94	6.03
560	81DA561M250MB2D	35 x 30	254.0	113.0	2.82	4.23
680	81DA681M250MC2D	35 x 35	202.6	90.6	3.32	4.97
820	81DA821M250MD2D	35 x 40	160.0	72.1	3.91	5.83
1000	81DA102M250ME2D	35 x 50	122.2	55.6	4.69	7.07
1500	81DA152M250MF2D	35 x 63	93.5	43.2	5.78	8.77
1800	81DA182M250MG2D	35 x 80	71.3	33.5	6.83	10.80
560	81DA561M250NA2F	40 x 25	215.2	89.7	3.20	4.96
820	81DA821M250NB2F	40 x 30	159.8	66.9	3.90	6.03
1000	81DA102M250NC2F	40 x 35	127.3	53.6	4.10	6.32
1200	81DA122M250ND2F	40 x 40	100.4	42.5	4.82	7.41
1500	81DA152M250NE2F	40 x 50	76.5	32.7	6.00	9.18
2200	81DA222M250NF2F	40 x 63	58.4	25.3	7.44	11.30
2700	81DA272M250NG2F	40 x 80	44.3	19.5	9.38	14.13
300 VOLTS DC WORKING; 350 VOLTS SURGE						
82	81DA820M300HA2D	22 x 25	2830.5	1800.0	0.58	0.73
120	81DA121M300HB2D	22 x 30	2024.0	1210.0	0.73	0.92
180	81DA181M300HD2D	22 x 40	1217.0	780.0	1.06	1.32
120	81DA121M300JA2D	25 x 25	2020.8	1270.0	0.76	0.95
180	81DA181M300JB2D	25 x 30	1445.4	870.0	0.95	1.38
220	81DA221M300JC2D	25 x 35	1125.7	680.0	1.18	1.54
270	81DA271M300JD2D	25 x 40	869.8	520.0	1.46	1.93
390	81DA391M300JE2D	25 x 50	649.2	390.0	1.78	2.33
180	81DA181M300KA2D	30 x 25	1331.0	863.4	1.05	1.30
270	81DA271M300KB2D	30 x 30	952.6	570.0	1.31	1.62
330	81DA331M300KC2D	30 x 35	742.3	460.0	1.56	1.94
390	81DA391M300KD2D	30 x 40	574.0	350.0	1.86	2.31
560	81DA561M300KE2D	30 x 50	428.9	260.0	2.36	2.93
330	81DA331M300MB2D	35 x 30	748.9	450.0	1.64	2.03
470	81DA471M300MC2D	35 x 35	583.8	350.0	1.96	2.42
560	81DA561M300MD2D	35 x 40	450.0	270.0	2.33	2.87
680	81DA681M300ME2D	35 x 50	337.9	200.0	2.62	3.27
1000	81DA102M300MF2D	35 x 63	250.0	150.0	3.29	4.21
1200	81DA122M300MG2D	35 x 80	189.4	110.0	4.76	5.28
390	81DA391M300NA2F	40 x 25	681.9	442.1	1.80	2.23
470	81DA471M300NB2F	40 x 30	488.0	316.6	2.23	2.77
680	81DA681M300NC2F	40 x 35	380.3	246.8	2.37	2.94
820	81DA821M300ND2F	40 x 40	294.0	191.0	2.81	3.49
1200	81DA122M300NE2F	40 x 50	219.7	142.9	3.54	4.39
1500	81DA152M300NF2F	40 x 63	164.6	107.2	4.43	5.49
1800	81DA182M300NG2F	40 x 80	122.8	80.1	5.63	6.97

STANDARD RATINGS

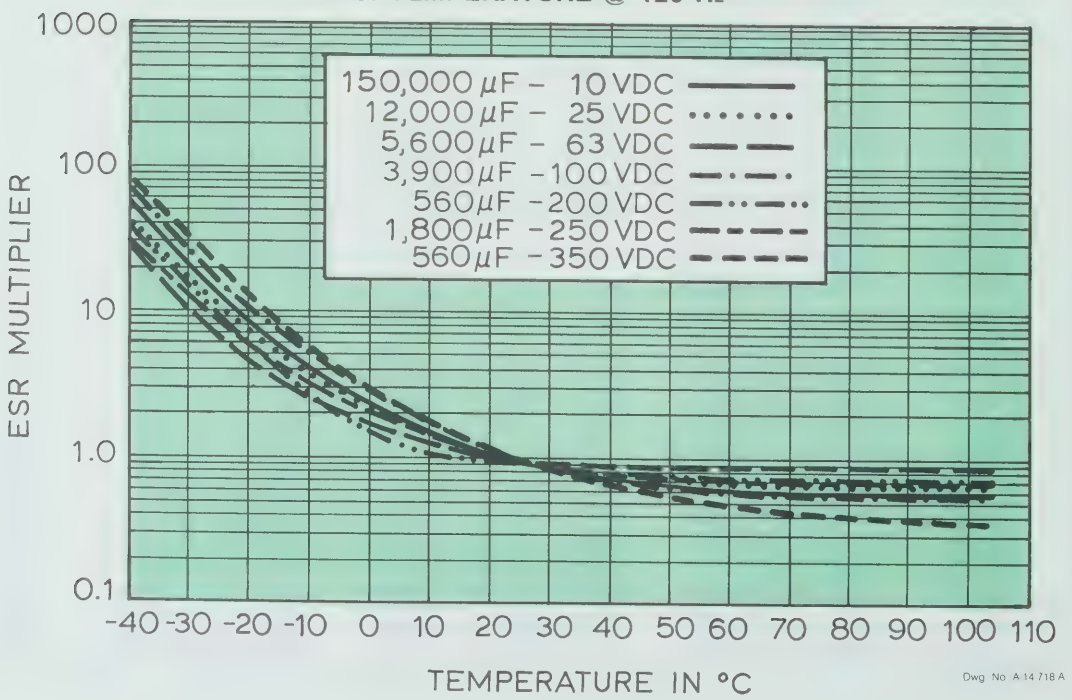
µF	Catalog Number	Nominal Case Size Millimeters D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-40k	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-40kHz
350 VOLTS DC WORKING; 400 VOLTS SURGE						
68	81DA680M350HA2D	22 x 25	3039.2	1823.8	0.56	0.73
100	81DA101M350HB2D	22 x 30	2173.1	1304.5	0.71	0.92
150	81DA151M350HD2D	22 x 40	1306.5	784.9	1.02	1.32
100	81DA101M350JA2D	25 x 25	2168.8	1305.0	0.73	0.95
120	81DA121M350JB2D	25 x 30	1551.2	933.9	0.92	1.19
180	81DA181M350JC2D	25 x 35	1207.9	727.5	1.10	1.42
220	81DA221M350JD2D	25 x 40	933.2	562.4	1.32	1.70
270	81DA271M350JE2D	25 x 50	696.5	420.1	1.68	2.16
150	81DA151M350KA2D	30 x 25	1426.8	864.8	1.01	1.30
220	81DA221M350KB2D	30 x 30	1021.0	619.3	1.26	1.62
270	81DA271M350KC2D	30 x 35	795.5	482.9	1.51	1.94
330	81DA331M350KD2D	30 x 40	615.1	373.7	1.80	2.31
470	81DA471M350KE2D	30 x 50	459.5	279.5	2.28	2.93
270	81DA271M350MB2D	35 x 30	801.6	490.2	1.59	2.03
330	81DA331M350MC2D	35 x 35	624.8	382.4	1.89	2.42
470	81DA471M350MD2D	35 x 40	483.4	296.2	2.25	2.87
560	81DA561M350ME2D	35 x 50	361.4	221.8	2.54	3.27
820	81DA821M350MF2D	35 x 63	271.1	166.8	3.18	4.21
1000	81DA102M350MG2D	35 x 80	202.4	124.9	4.05	5.16
270	81DA271M350NA2F	40 x 25	731.1	442.9	1.74	2.23
390	81DA391M350NB2F	40 x 30	523.2	317.1	2.15	2.77
470	81DA471M350NC2F	40 x 35	407.6	247.2	2.29	2.94
680	81DA681M350ND2F	40 x 40	315.1	191.3	2.72	3.49
820	81DA821M350NE2F	40 x 50	235.4	143.1	3.42	4.39
1200	81DA122M350NF2F	40 x 63	176.3	107.4	4.28	5.48
1500	81DA152M350NG2F	40 x 80	131.4	80.2	5.44	6.97
400 VOLTS DC WORKING; 450 VOLTS SURGE						
56	81DA560M400HA2D	22 x 25	3212.9	1825.8	0.55	0.73
82	81DA820M400HB2D	22 x 30	2297.2	1306.0	0.69	0.91
120	81DA121M400HD2D	22 x 40	1381.0	785.8	0.99	1.32
82	81DA820M400JA2D	25 x 25	2291.9	1306.5	0.71	0.95
120	81DA121M400JB2D	25 x 30	1639.2	934.9	0.89	1.18
150	81DA151M400JC2D	25 x 35	1276.4	728.4	1.07	1.42
180	81DA181M400JD2D	25 x 40	986.1	563.1	1.28	1.70
270	81DA271M400JE2D	25 x 50	735.8	420.6	1.63	2.16
120	81DA121M400KA2D	30 x 25	1506.5	865.7	0.99	1.30
180	81DA181M400KB2D	30 x 30	1078.0	620.0	1.23	1.62
220	81DA221M400KC2D	30 x 35	839.8	483.4	1.47	1.94
270	81DA271M400KD2D	30 x 40	649.2	374.1	1.756	2.31
390	81DA391M400KE2D	30 x 50	485.0	279.8	2.22	2.93
220	81DA221M400MB2D	35 x 30	845.5	490.7	1.54	2.03
270	81DA271M400MC2D	35 x 35	659.0	382.8	1.84	2.42
390	81DA391M400MD2D	35 x 40	509.7	296.5	2.19	2.87
470	81DA471M400ME2D	35 x 50	381.0	222.1	2.47	3.24
680	81DA681M400MF2D	35 x 63	285.7	166.9	3.10	4.05
820	81DA821M400MG2D	35 x 80	213.2	125.0	3.95	5.16
270	81DA271M400NA2F	40 x 25	772.0	443.3	1.69	2.23
330	81DA331M400NB2F	40 x 30	552.4	317.5	2.10	2.76
470	81DA471M400NC2F	40 x 35	430.3	247.5	2.23	2.94
560	81DA561M400ND2F	40 x 40	332.7	191.5	2.64	3.49
680	81DA681M400NE2F	40 x 50	248.5	143.3	3.33	4.38
1000	81DA102M400NF2F	40 x 63	186.1	107.5	4.16	5.48
1200	81DA122M400NG2F	40 x 80	138.7	80.3	5.30	6.96

TYPICAL CURVES

TYPE 81DA — TYPICAL CAPACITANCE RATIO VS. TEMPERATURE @ 120 Hz

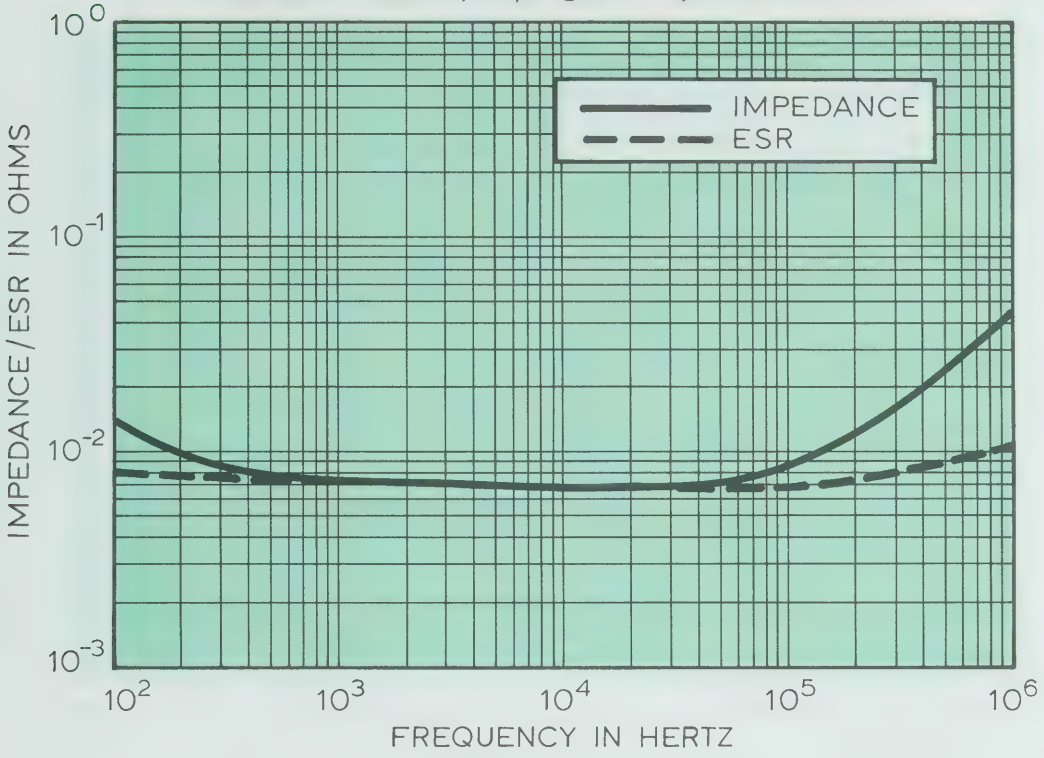


TYPE 81DA — TYPICAL ESR MULTIPLIER VS. TEMPERATURE @ 120 Hz



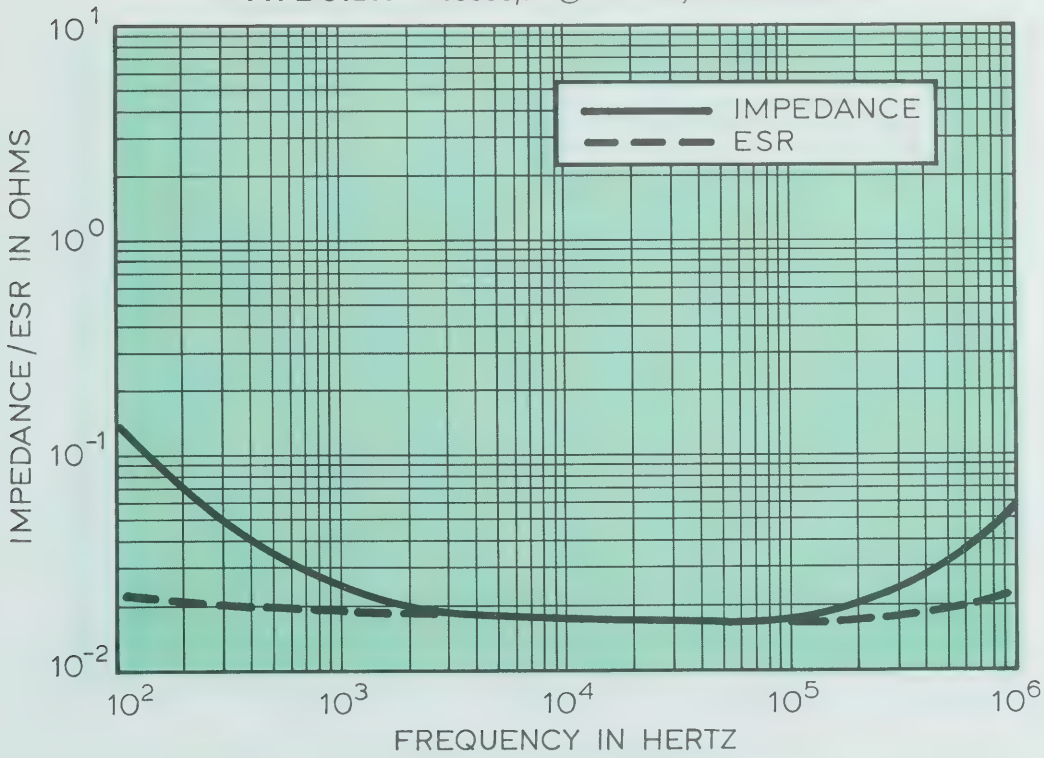
TYPICAL CURVES @ +25°C

TYPE 81DA — 150,000μF @ 10VDC, MG CASE SIZE



Dwg. No. A-14,668

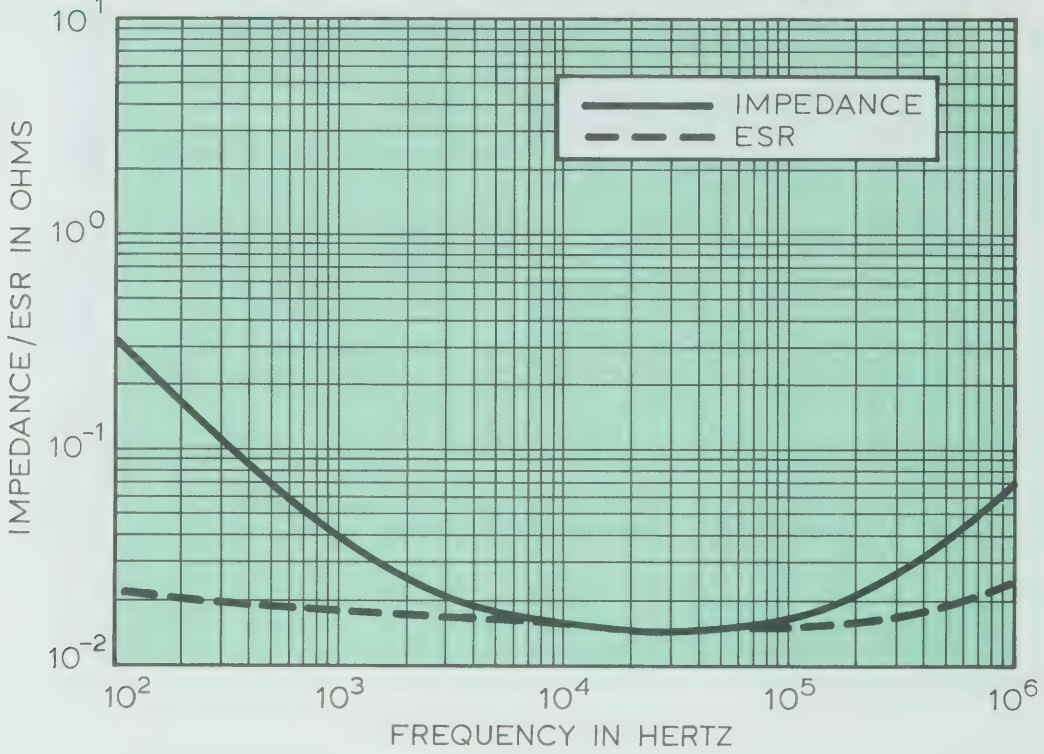
TYPE 81DA — 15000μF @ 25VDC, JE CASE SIZE



Dwg. No. A-14,667

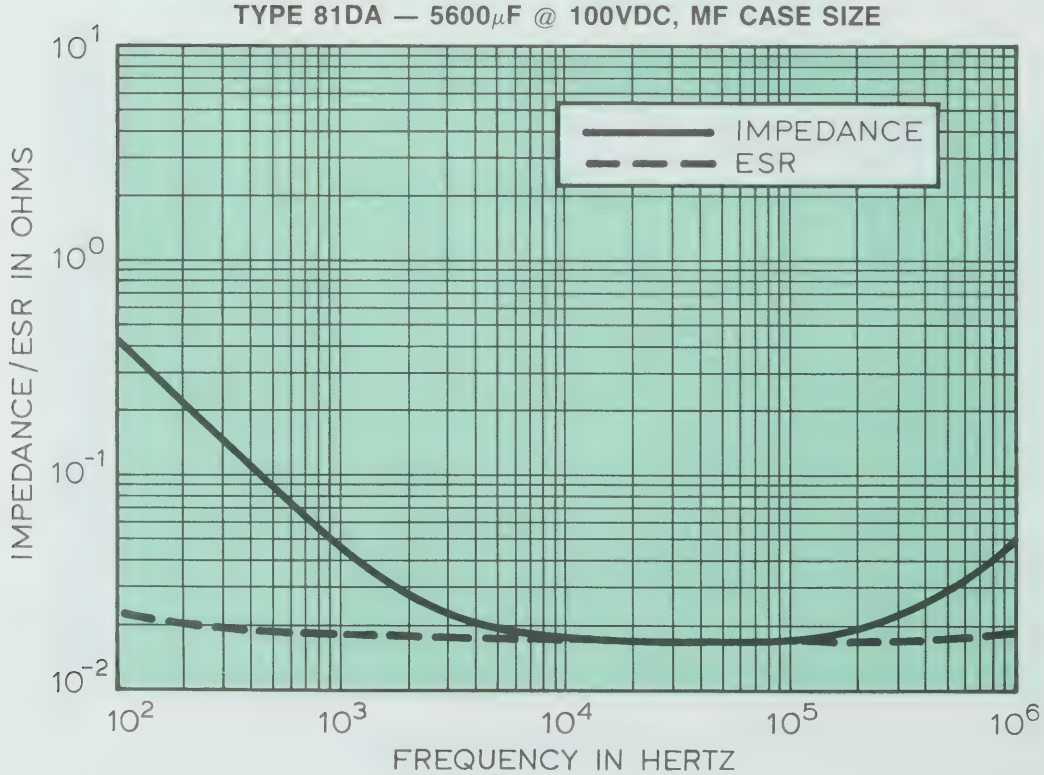
TYPICAL CURVES @ +25°C

TYPE 81DA — 8200μF @ 63VDC, KE CASE SIZE



Dwg. No. A-14,666

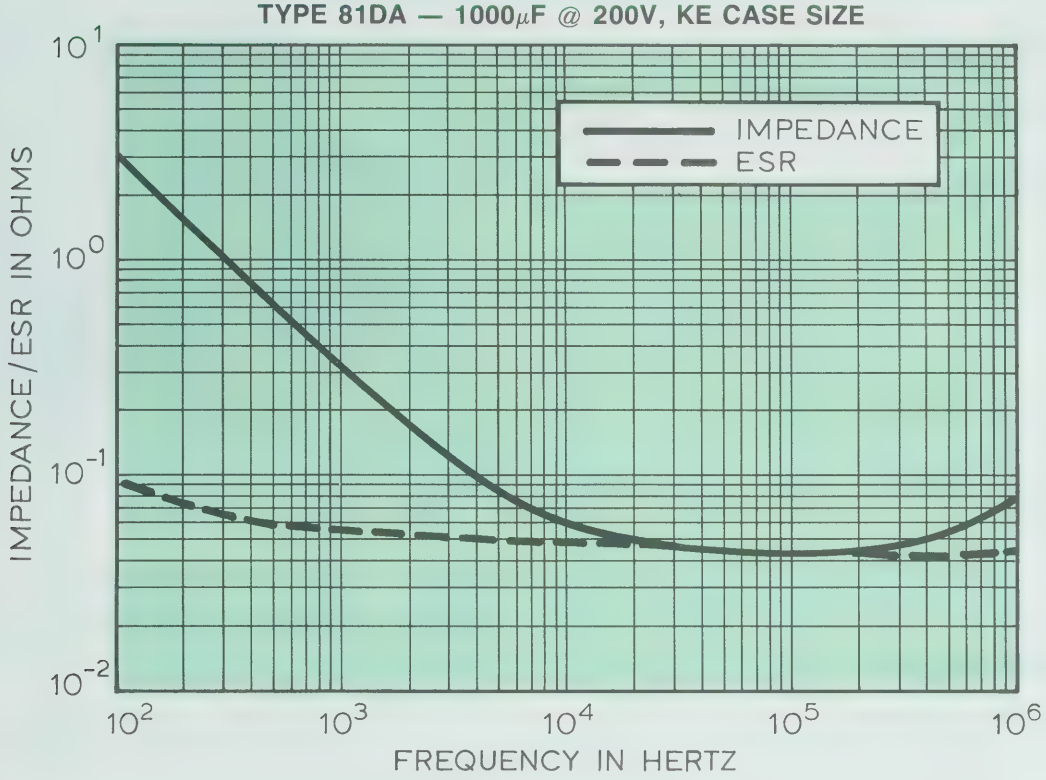
TYPE 81DA — 5600μF @ 100VDC, MF CASE SIZE



Dwg. No. A-14,671

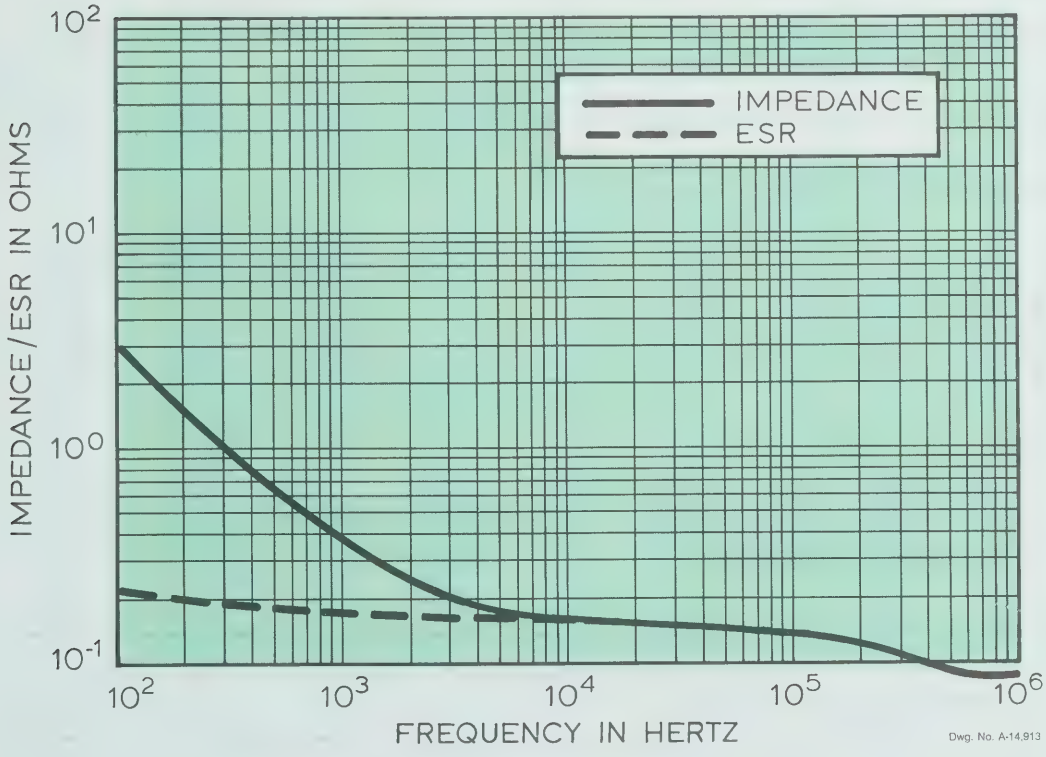
TYPICAL CURVES @ +25°C

TYPE 81DA — 1000μF @ 200V, KE CASE SIZE



Dwg. No. A-14,670

TYPE 81DA — 560μF @ 350VDC, ME CASE SIZE



Dwg. No. A-14,913

+105°C Snap Mount Aluminum Capacitors

L65-10

Features —

- Operating Temperature to +105°C
- High Ripple Current Capability
- Low ESR

General Specifications —

Operating Temperature: −40°C to +105°C.

Voltage Range: 6.3 - 400 VDC.

Capacitance Range: 47μF - 180,000μF.

Capacitance Tolerance: ±20%.

Case Size Range: 22 x 25mm - 35 x 80mm.

Termination: See outline drawings.

Life Validation Test: 2000 hrs @ +105°C:
- Δ CAP ≤ 15% from initial measurement.
- Δ ESR ≤ 1.5x initial specified limit.
- Δ DCL ≤ initial specified limit.

Shelf Test: 500 hrs @ +85°C:
- Δ CAP ≤ 15% from initial measurement.
- Δ ESR ≤ 1.3x initial specified limit.
- Δ DCL ≤ 2x initial specified limit.

DC Leakage Current: after 5 min. charge.
$I = K\sqrt{CV}$
K = 4.0 @ +25°C
I in μa, C in μF, V in Volts

Ripple Current Multipliers:

TEMPERATURE

Ambient Temp.	+55°C	+65°C	+75°C	+85°C	+95°C	+105°C
Multipliers	1.5	1.34	1.2	1.0	.77	.45

FREQUENCY Hz

Rated VDC	50-60	300-1000	Above 1000
0-49	0.85	1.10	1.15
50-199	0.83	1.15	1.20
200-400	0.80	1.30	1.40

Performance Characteristics —

SEE PAGE 2.

Note: Type 81D Original Ratings are recommended for replacement applications only. For new designs, see Type 81DA.

Catalog Numbering System

81D 822 M 6R3 HA 2 D

LEAD CODE. D = 2 PIN SNAP IN (Standard).
SEE TERMINAL CONFIGURATION, PAGE 112
FOR LEAD CODE OPTIONS.

CASE STYLE. 2 = PVC INSULATING SLEEVE (Standard).
5 = PVC SLEEVE WITH RESIN END SEAL.
(Required for exposure to halogenated cleaning solvents).

CASE CODE. SEE DIMENSIONS, BELOW.

DC VOLTAGE RATING. EXPRESSED IN VOLTS. AN 'R' INDICATES A DECIMAL POINT, FOR EXAMPLE, 6R3 = 6.3 VOLTS.

CAPACITANCE TOLERANCE. M = ±20%.

CAPACITANCE. EXPRESSED IN MICROFARADS. THE FIRST TWO DIGITS ARE SIGNIFICANT FIGURES, THE THIRD IS THE NUMBER OF ZEROS.

TYPE NUMBER. IDENTIFIES THE BASIC CAPACITOR DESIGN.

DIMENSIONS

	MILLIMETERS		INCHES		STYLE 2
CASE CODE	DIAMETER D +1/-0	LENGTH L ± 2	DIAMETER D, +0.04/-0	LENGTH L, ±0.08	TYPICAL WEIGHT (GRAMS)
HA	22	25	0.87	1.00	16
HB	22	30	0.87	1.18	19
HD	22	40	0.87	1.57	24
JA	25	25	1.00	1.00	20
JB	25	30	1.00	1.18	24
JC	25	35	1.00	1.38	27
JD	25	40	1.00	1.57	31
JE	25	50	1.00	2.00	38
KA	30	25	1.18	1.00	30
KB	30	30	1.18	1.18	35
KC	30	35	1.18	1.38	39
KD	30	40	1.18	1.57	44
KE	30	50	1.18	2.00	53
MB	35	30	1.38	1.18	48
MC	35	35	1.38	1.38	54
MD	35	40	1.38	1.57	61
ME	35	50	1.38	2.00	74
MF	35	63	1.38	2.50	91
MG	35	80	1.38	3.18	113

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size Millimeters D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-40k	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-40k
6.3 VOLTS DC WORKING; 8 VOLTS DC SURGE						
8200	81D822M6R3HA2D	22 x 25	87.0	68.0	3.15	3.57
18000	81D183M6R3HB2D	22 x 30	79.0	61.0	3.49	4.01
27000	81D273M6R3HD2D	22 x 40	52.0	40.0	4.85	5.52
12000	81D123M6R3JA2D	25 x 25	73.0	58.0	3.71	4.20
27000	81D273M6R3JB2D	25 x 30	65.0	50.0	4.21	4.78
33000	81D333M6R3JC2D	25 x 35	52.0	41.0	4.98	6.28
39000	81D393M6R3JD2D	25 x 40	42.0	33.0	6.07	6.85
56000	81D563M6R3JE2D	25 x 50	33.0	26.0	7.19	7.95
18000	81D183M6R3KA2D	30 x 25	66.0	54.0	4.39	4.91
39000	81D393M6R3KB2D	30 x 30	51.0	41.0	5.31	5.94
47000	81D473M6R3KC2D	30 x 35	41.0	33.0	6.25	7.04
68000	81D683M6R3KD2D	30 x 40	33.0	27.0	7.38	8.16
82000	81D823M6R3KE2D	30 x 50	27.0	21.0	8.89	10.00
56000	81D563M6R3MB2D	35 x 30	31.0	25.0	7.60	8.45
68000	81D683M6R3MC2D	35 x 35	26.0	20.0	8.66	9.81
82000	81D823M6R3MD2D	35 x 40	21.0	16.3	10.20	11.50
100000	81D104M6R3ME2D	35 x 50	17.0	13.5	12.20	13.60
150000	81D154M6R3MF2D	35 x 63	13.3	10.6	15.30	16.10
180000	81D184M6R3MG2D	35 x 80	11.0	9.0	18.10	20.10
10 VOLTS DC WORKING; 12 VOLTS DC SURGE						
6800	81D682M010HA2D	22 x 25	92.0	70.0	3.07	3.52
12000	81D123M010HB2D	22 x 30	85.0	64.0	3.40	3.91
22000	81D223M010HD2D	22 x 40	54.0	41.0	4.78	5.52
10000	81D103M010JA2D	25 x 25	74.0	57.0	3.71	4.26
18000	81D183M010JB2D	25 x 30	67.0	51.0	4.16	4.78
22000	81D223M010JC2D	25 x 35	55.0	42.0	4.84	5.05
27000	81D273M010JD2D	25 x 40	44.4	34.0	5.87	6.70
39000	81D393M010JE2D	25 x 50	34.6	26.0	7.04	8.18
15000	81D153M010KA2D	30 x 25	67.0	54.0	4.39	4.91
27000	81D273M010KB2D	30 x 30	53.0	41.0	5.24	5.94
39000	81D393M010KC2D	30 x 35	43.0	34.0	6.14	6.89
47000	81D473M010KD2D	30 x 40	34.7	27.0	7.22	8.16
56000	81D563M010KE2D	30 x 50	27.7	21.0	8.89	10.00
39000	81D393M010MB2D	35 x 30	33.0	26.0	7.36	8.28
47000	81D473M010MC2D	35 x 35	27.0	21.0	8.56	9.71
56000	81D563M010MD2D	35 x 40	22.0	17.0	9.89	11.20
82000	81D823M010ME2D	35 x 50	17.1	13.4	12.10	13.70
100000	81D104M010MF2D	35 x 63	14.1	11.0	14.90	16.90
150000	81D154M010MG2D	35 x 80	11.1	9.0	18.10	19.90
16 VOLTS DC WORKING; 20 VOLTS DC SURGE						
5600	81D562M016HA2D	22 x 25	96.0	71.0	2.12	2.46
10000	81D103M016HB2D	22 x 30	86.0	63.0	3.37	3.96
15000	81D153M016HD2D	22 x 40	57.7	42.0	4.59	5.42
8200	81D822M016JA2D	25 x 25	77.0	58.0	3.64	4.21
12000	81D123M016JB2D	25 x 30	71.0	53.0	4.03	4.65
15000	81D153M016JC2D	25 x 35	58.0	43.0	4.72	5.47

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size Millimeters D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-40k	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-40k
16 VOLTS DC WORKING; 20 VOLTS DC SURGE (Cont.)						
22000	81D223M016JD2D	25 x 40	44.8	33.0	5.87	6.85
27000	81D273M016JE2D	25 x 50	35.0	26.0	6.92	8.04
12000	81D123M016KA2D	30 x 25	67.7	54.0	4.34	4.91
22000	81D223M016KB2D	30 x 30	53.7	41.0	5.24	5.94
27000	81D273M016KC2D	30 x 35	43.8	33.0	6.04	7.05
33000	81D333M016KD2D	30 x 40	35.3	27.0	7.07	8.16
39000	81D393M016KE2D	30 x 50	28.0	21.8	8.66	9.74
27000	81D273M016MB2D	35 x 30	35.0	26.0	7.14	8.28
33000	81D333M016MC2D	35 x 35	28.0	21.0	8.42	9.71
47000	81D473M016MD2D	35 x 40	23.0	17.0	9.70	11.20
56000	81D563M016ME2D	35 x 50	17.5	13.3	12.00	13.80
68000	81D683M016MF2D	35 x 63	15.2	11.0	14.40	16.90
100000	81D104M016MG2D	35 x 80	11.2	9.0	18.00	19.90
25 VOLTS DC WORKING; 30 VOLTS DC SURGE						
3300	81D332M025HA2D	22 x 25	110.0	76.0	2.81	3.38
4700	81D472M025HB2D	22 x 30	85.0	58.0	3.40	4.11
8200	81D822M025HD2D	22 x 40	54.0	37.0	4.78	5.74
4700	81D472M025JA2D	25 x 25	86.0	60.0	3.44	4.15
6800	81D682M025JB2D	25 x 30	67.0	47.0	4.16	4.93
8200	81D822M025JC2D	25 x 35	54.0	38.0	4.91	5.78
10000	81D103M025JD2D	25 x 40	43.4	31.0	5.97	7.02
15000	81D153M025JE2D	25 x 50	33.9	24.0	7.04	8.44
6800	81D682M025KA2D	30 x 25	71.0	54.0	4.25	4.91
10000	81D103M025KB2D	30 x 30	54.0	41.0	5.24	5.94
12000	81D123M025KC2D	30 x 35	44.0	33.0	6.04	7.05
15000	81D153M025KD2D	30 x 40	36.4	27.0	7.07	8.16
22000	81D223M025KE2D	30 x 50	28.1	22.0	8.66	9.74
12000	81D123M025MB2D	35 x 30	35.0	25.0	7.14	8.45
18000	81D183M025MC2D	35 x 35	28.0	20.0	8.13	9.96
22000	81D223M025MD2D	35 x 40	23.0	17.0	9.41	11.20
27000	81D273M025ME2D	35 x 50	17.5	13.0	12.00	13.90
33000	81D333M025MF2D	35 x 63	14.0	10.0	15.00	17.70
47000	81D473M025MG2D	35 x 80	11.2	9.0	18.00	19.90
35 VOLTS DC WORKING; 40 VOLTS DC SURGE						
2200	81D222M035HA2D	22 x 25	121.0	76.0	2.67	3.38
3300	81D332M035HB2D	22 x 30	92.0	57.0	3.26	4.16
4700	81D472M035HD2D	22 x 40	59.0	37.0	4.54	5.74
3300	81D332M035JA2D	25 x 25	95.0	62.0	3.28	4.05
4700	81D472M035JB2D	25 x 30	72.0	47.0	3.98	4.93
5600	81D562M035JC2D	25 x 35	58.0	38.0	4.72	5.78
6800	81D682M035JD2D	25 x 40	46.6	30.0	5.77	7.19
10000	81D103M035JE2D	25 x 50	36.3	24.0	6.89	8.44
4700	81D472M035KA2D	30 x 25	75.0	54.0	4.13	4.84
6800	81D682M035KB2D	30 x 30	57.0	41.0	5.10	5.94
8200	81D822M035KC2D	30 x 35	46.6	33.0	5.94	7.05
12000	81D123M035KD2D	30 x 40	37.7	27.0	6.92	8.16
15000	81D153M035KE2D	30 x 50	30.5	22.0	8.44	9.74

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size Millimeters D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-40k	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-40k
35 VOLTS DC WORKING; 40 VOLTS DC SURGE (Cont.)						
10000	81D103M035MB2D	35 x 30	36.0	24.0	7.04	8.63
12000	81D123M035MC2D	35 x 35	29.3	20.0	5.82	9.45
15000	81D153M035MD2D	35 x 40	25.0	16.3	9.29	11.50
18000	81D183M035ME2D	35 x 50	19.0	13.0	11.50	13.90
27000	81D273M035MF2D	35 x 63	15.0	10.0	14.50	17.70
33000	81D333M035MG2D	35 x 80	12.0	9.0	17.30	19.90
50 VOLTS DC WORKING; 63 VOLTS DC SURGE						
1200	81D122M050HA2D	22 x 25	148.0	79.0	2.41	3.29
1800	81D182M050HB2D	22 x 30	108.0	58.0	3.00	4.11
2700	81D272M050HD2D	22 x 40	70.0	38.0	4.18	5.63
1800	81D182M050JA2D	25 x 25	110.0	62.0	3.05	4.05
2200	81D222M050JB2D	25 x 30	85.0	48.0	3.69	4.93
2700	81D272M050JC2D	25 x 35	68.0	38.0	4.34	5.89
3900	81D392M050JD2D	25 x 40	53.6	31.0	5.36	7.02
4700	81D472M050JE2D	25 x 50	42.0	24.0	6.38	8.44
2700	81D272M050KA2D	30 x 25	85.0	54.0	3.87	4.84
3900	81D392M050KB2D	30 x 30	65.0	41.0	4.74	5.94
4700	81D472M050KC2D	30 x 35	53.0	33.0	5.51	7.05
5600	81D562M050KD2D	30 x 40	42.4	27.7	6.43	7.94
6800	81D682M050KE2D	30 x 50	33.0	22.0	8.04	9.74
4700	81D472M050MB2D	35 x 30	43.0	24.0	6.45	8.63
5600	81D562M050MC2D	35 x 35	34.0	20.0	7.64	9.96
6800	81D682M050MD2D	35 x 40	28.0	16.0	8.79	11.61
10000	81D103M050ME2D	35 x 50	22.0	13.0	10.76	13.97
12000	81D123M050MF2D	35 x 63	17.3	10.5	13.48	17.33
18000	81D183M050MG2D	35 x 80	14.0	9.0	16.14	19.98
63 VOLTS DC WORKING; 79 VOLTS DC SURGE						
1000	81D102M063HA2D	22 x 25	151.0	75.0	2.39	3.39
1500	81D152M063HB2D	22 x 30	118.0	59.0	2.87	4.06
2200	81D222M063HD2D	22 x 40	74.0	38.0	4.06	5.63
1500	81D152M063JA2D	25 x 25	121.0	63.0	2.90	4.05
1800	81D182M063JB2D	25 x 30	88.0	46.0	3.61	5.02
2200	81D222M063JC2D	25 x 35	72.0	38.0	4.21	5.78
3300	81D332M063JD2D	25 x 40	57.0	30.0	5.22	7.19
3900	81D392M063JE2D	25 x 50	44.0	24.0	6.16	8.44
2200	81D222M063KA2D	30 x 25	90.0	54.0	3.78	4.85
2700	81D272M063KB2D	30 x 30	73.0	41.0	4.45	5.95
3900	81D392M063KC2D	30 x 35	55.0	33.0	5.44	7.05
4700	81D472M063KD2D	30 x 40	44.0	27.0	6.32	8.16
5600	81D562M063KE2D	30 x 50	37.0	22.0	7.55	9.75
3900	81D392M063MB2D	35 x 30	45.0	24.0	6.26	8.50
4700	81D472M063MC2D	35 x 35	36.0	20.0	7.42	9.96
5600	81D562M063MD2D	35 x 40	32.0	16.0	8.29	11.60
8200	81D822M063ME2D	35 x 50	23.0	13.0	10.52	13.97
10000	81D103M063MF2D	35 x 63	18.4	10.4	13.10	17.42
15000	81D153M063MG2D	35 x 80	14.1	9.0	18.05	19.98

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size Millimeters D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-40k	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-40k
80 VOLTS DC WORKING; 100 VOLTS DC SURGE						
680	81D681M080HA2D	22 x 25	268.0	150.0	1.79	2.39
820	81D821M080HB2D	22 x 30	203.0	114.0	2.19	2.93
1500	81D152M080HD2D	22 x 40	131.0	74.0	3.04	4.06
1000	81D102M080JA2D	25 x 25	200.0	114.0	2.25	2.99
1200	81D122M080JB2D	25 x 30	160.0	91.0	2.69	3.58
1500	81D152M080JC2D	25 x 35	126.0	72.0	3.20	4.26
1800	81D182M080JD2D	25 x 40	99.0	57.0	3.93	5.22
2700	81D272M080JE2D	25 x 50	75.0	44.0	4.73	6.16
1500	81D152M080KA2D	30 x 25	147.0	87.0	2.55	3.84
1800	81D182M080KB2D	30 x 30	109.0	66.0	3.66	4.69
2200	81D222M080KC2D	30 x 35	86.0	52.0	4.35	5.59
2700	81D272M080KD2D	30 x 40	74.0	42.0	4.90	6.55
3900	81D392M080KE2D	30 x 50	54.0	33.0	6.29	8.05
2700	81D272M080MB2D	35 x 30	75.0	44.0	4.88	6.36
3300	81D332M080MC2D	35 x 35	61.0	35.0	5.67	7.50
3900	81D392M080MD2D	35 x 40	48.0	28.0	6.67	8.80
5600	81D562M080ME2D	35 x 50	37.0	22.0	8.29	10.72
6800	81D682M080MF2D	35 x 63	29.0	17.0	10.43	13.60
10000	81D103M080MG2D	35 x 80	23.0	13.5	12.60	16.40
100 VOLTS DC WORKING; 125 VOLTS DC SURGE						
390	81D391M100HA2D	22 x 25	343.0	151.0	1.58	2.39
470	81D471M100HB2D	22 x 30	258.0	114.0	1.94	2.93
820	81D821M100HD2D	22 x 40	161.0	72.0	2.75	4.10
560	81D561M100JA2D	25 x 25	253.0	115.0	2.00	2.97
680	81D681M100JB2D	25 x 30	188.0	86.0	2.48	3.67
820	81D821M100JC2D	25 x 35	150.0	69.0	2.92	4.30
1200	81D122M100JD2D	25 x 40	125.0	57.0	3.49	5.15
1500	81D152M100JE2D	25 x 50	90.0	42.0	4.32	6.38
820	81D821M100KA2D	30 x 25	178.0	86.0	2.68	3.87
1000	81D102M100KB2D	30 x 30	136.0	66.0	3.28	4.69
1500	81D152M100KC2D	30 x 35	106.0	52.0	3.90	5.59
1800	81D182M100KD2D	30 x 40	86.0	42.0	4.55	6.55
2200	81D222M100KE2D	30 x 50	66.0	33.0	5.69	8.05
1500	81D152M100MB2D	35 x 30	98.0	44.0	4.26	6.36
1800	81D182M100MC2D	35 x 35	79.0	36.0	5.00	7.35
2200	81D222M100MD2D	35 x 40	61.0	28.0	5.92	8.80
2700	81D272M100ME2D	35 x 50	46.0	22.0	6.74	10.72
3900	81D392M100MF2D	35 x 63	36.0	17.2	9.35	13.54
4700	81D472M100MG2D	35 x 80	28.0	13.5	11.41	16.40
160 VOLTS DC WORKING; 200 VOLTS DC SURGE						
180	81D181M160HA2D	22 x 25	741.0	392.0	1.14	1.57
220	81D221M160HB2D	22 x 30	551.0	291.0	1.41	1.94
390	81D391M160HD2D	22 x 40	344.0	184.0	1.99	2.72
220	81D221M160JA2D	25 x 25	548.0	296.0	1.44	1.96
330	81D331M160JB2D	25 x 30	411.0	221.0	1.77	2.42
390	81D391M160JC2D	25 x 35	326.0	176.0	2.11	2.86
470	81D471M160JD2D	25 x 40	256.0	139.0	2.59	3.51
680	81D681M160JE2D	25 x 50	194.0	107.0	3.12	4.18

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size Millimeters D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-40k	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-40k
160 VOLTS DC WORKING; 200 VOLTS DC SURGE (Cont.)						
390	81D391M160KA2D	30 x 25	374.0	211.0	1.96	2.61
470	81D471M160KB2D	30 x 30	278.0	157.0	2.43	3.22
680	81D681M160KC2D	30 x 35	222.0	128.0	2.85	3.77
820	81D821M160KD2D	30 x 40	175.0	99.0	3.38	4.47
1000	81D102M160KE2D	30 x 50	136.0	77.0	4.16	5.51
680	81D681M160MB2D	35 x 30	221.0	130.0	3.02	3.94
820	81D821M160MC2D	35 x 35	176.0	104.0	3.56	4.62
1200	81D122M160MD2D	35 x 40	139.0	83.0	4.18	5.42
1500	81D152M160ME2D	35 x 50	107.0	64.0	5.15	6.65
1800	81D182M160MF2D	35 x 63	82.0	50.0	5.72	7.31
2700	81D272M160MG2D	35 x 80	62.0	38.0	8.07	10.3
200 VOLTS DC WORKING; 250 VOLTS DC SURGE						
150	81D151M200HA2D	22 x 25	1012.0	361.0	0.982	1.64
220	81D221M200HB2D	22 x 30	594.0	255.0	1.37	2.09
330	81D331M200HD2D	22 x 40	381.0	165.0	1.91	2.91
220	81D221M200JA2D	25 x 25	625.0	272.0	1.37	2.08
270	81D271M200JB2D	25 x 30	525.0	190.0	1.59	2.62
390	81D391M200JC2D	25 x 35	341.0	151.0	2.08	3.12
470	81D471M200JD2D	25 x 40	272.0	120.0	2.49	3.81
560	81D561M200JE2D	25 x 50	205.0	91.0	3.06	4.58
330	81D331M200KA2D	30 x 25	498.0	192.0	1.71	2.77
470	81D471M200KB2D	30 x 30	294.0	136.0	2.39	3.51
560	81D561M200KC2D	30 x 35	279.0	107.0	2.57	4.18
680	81D681M200KD2D	30 x 40	221.0	87.0	3.02	4.83
1000	81D102M200KE2D	30 x 50	142.0	67.0	4.09	5.95
560	81D561M200MB2D	35 x 30	287.0	116.0	2.67	4.19
820	81D821M200MC2D	35 x 35	189.0	93.0	3.47	4.94
1000	81D102M200MD2D	35 x 40	149.0	74.0	4.07	5.78
1200	81D122M200ME2D	35 x 50	116.0	58.0	5.01	7.07
1800	81D182M200MF2D	35 x 63	89.0	45.0	6.37	8.93
2200	81D222M200MG2D	35 x 80	68.0	36.0	7.88	10.70
250 VOLTS DC WORKING; 300 VOLTS DC SURGE						
120	81D121M250HA2D	22 x 25	1077.0	385.0	0.96	1.61
180	81D181M250HB2D	22 x 30	722.0	261.0	1.24	2.06
220	81D221M250HD2D	22 x 40	558.0	166.0	1.57	2.89
180	81D181M250JA2D	25 x 25	753.0	275.0	1.25	2.05
220	81D221M250JB2D	25 x 30	513.0	189.0	1.61	2.64
270	81D271M250JC2D	25 x 35	494.0	151.0	1.71	3.12
330	81D331M250JD2D	25 x 40	382.0	121.0	2.12	3.81
470	81D471M250JE2D	25 x 50	243.0	93.0	2.81	4.54
270	81D271M250KA2D	30 x 25	500.0	194.0	1.66	2.75
330	81D331M250KB2D	30 x 30	398.0	135.0	2.04	3.52
390	81D391M250KC2D	30 x 35	328.0	109.0	2.37	4.12
560	81D561M250KD2D	30 x 40	283.0	87.0	3.06	4.83
680	81D681M250KE2D	30 x 50	198.0	67.0	3.47	5.99
470	81D471M250MB2D	35 x 30	281.0	117.0	2.71	4.17
560	81D561M250MC2D	35 x 35	271.0	94.0	2.89	4.89

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size Millimeters D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-40k	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-40k
250 VOLTS DC WORKING; 300 VOLTS DC SURGE (Cont.)						
680	81D681M250MD2D	35 x 40	209.0	74.0	3.44	5.78
1000	81D102M250ME2D	35 x 50	132.0	58.0	4.69	7.07
1200	81D122M250MF2D	35 x 63	108.0	46.0	5.78	8.77
1500	81D152M250MG2D	35 x 80	93.0	35.0	6.69	10.80
300 VOLTS DC WORKING; 350 VOLTS DC SURGE						
68	81D680M300HA2D	22 x 25	3100.0	1800.0	0.475	0.634
100	81D101M300HB2D	22 x 30	2090.0	1210.0	0.622	0.829
120	81D121M300HD2D	22 x 40	1340.0	780.0	0.878	1.146
100	81D101M300JA2D	25 x 25	2180.0	1270.0	0.634	0.817
150	81D151M300JB2D	25 x 30	1490.0	870.0	0.805	1.378
180	81D181M300JC2D	25 x 35	1160.0	680.0	1.183	1.537
220	81D221M300JD2D	25 x 40	900.0	520.0	1.464	1.927
270	81D271M300JE2D	25 x 50	670.0	390.0	1.781	2.33
150	81D151M300KA2D	30 x 25	1530.0	900.0	0.841	1.098
220	81D221M300KB2D	30 x 30	970.0	570.0	1.122	1.464
270	81D271M300KC2D	30 x 35	780.0	460.0	1.317	1.72
330	81D331M300KD2D	30 x 40	600.0	350.0	1.573	2.061
470	81D471M300KE2D	30 x 50	440.0	260.0	2.000	2.61
270	81D271M300MB2D	35 x 30	750.0	450.0	1.415	1.83
330	81D331M300MC2D	35 x 35	590.0	350.0	1.683	2.196
470	81D471M300MD2D	35 x 40	450.0	270.0	2.013	2.598
560	81D561M300ME2D	35 x 50	340.0	200.0	2.513	3.269
820	81D821M300MF2D	35 x 63	250.0	150.0	3.257	4.209
1000	81D102M300MG2D	35 x 80	190.0	110.0	4.758	5.282
350 VOLTS DC WORKING; 400 VOLTS DC SURGE						
56	81D560M350HA2D	22 x 25	5110.0	2710.0	0.463	0.634
82	81D820M350HB2D	22 x 30	3550.0	1890.0	0.597	0.817
120	81D121M350HD2D	22 x 40	1990.0	1060.0	0.866	1.174
82	81D820M350JA2D	25 x 25	3550.0	1890.0	0.597	0.817
120	81D121M350JB2D	25 x 30	2420.0	1290.0	0.768	1.049
150	81D151M350JC2D	25 x 35	1990.0	1060.0	0.927	1.256
180	81D181M350JD2D	25 x 40	1650.0	880.0	1.134	1.549
220	81D221M350JE2D	25 x 50	1110.0	580.0	1.390	1.891
120	81D121M350KA2D	30 x 25	2420.0	1290.0	0.829	1.134
180	81D181M350KB2D	30 x 30	1650.0	880.0	1.061	1.427
220	81D221M350KC2D	30 x 35	1320.0	710.0	1.268	1.732
270	81D271M350KD2D	30 x 40	910.0	480.0	1.525	2.061
330	81D331M350KE2D	30 x 50	730.0	390.0	1.915	2.586
220	81D221M350MB2D	35 x 30	1110.0	580.0	1.329	1.793
270	81D271M350MC2D	35 x 35	910.0	480.0	1.598	2.159
330	81D331M350MD2D	35 x 40	730.0	390.0	1.939	2.598
470	81D471M350ME2D	35 x 50	510.0	270.0	2.440	3.269
680	81D681M350MF2D	35 x 63	420.0	220.0	3.135	4.209
820	81D821M350MG2D	35 x 80	290.0	150.0	3.904	5.160
385 VOLTS DC WORKING; 415 VOLTS DC SURGE						
47	81D470M385HA2D	22 x 25	3450.0	1800.0	0.463	0.634
68	81D680M385HB2D	22 x 30	2320.0	1210.0	0.597	0.817
120	81D121M385HD2D	22 x 40	1400.0	730.0	0.854	1.183

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size Millimeters D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-40k	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-40k
385 VOLTS DC WORKING; 415 VOLTS DC SURGE (Cont.)						
68	81D680M385JA2D	25 x 25	2430.0	1280.0	0.597	0.817
100	81D101M385JB2D	25 x 30	1650.0	870.0	0.768	1.049
120	81D121M385JC2D	25 x 35	1340.0	700.0	0.902	1.244
180	81D181M385JD2D	25 x 40	1020.0	540.0	1.122	1.537
220	81D221M385JE2D	25 x 50	780.0	410.0	1.342	1.854
120	81D121M385KA2D	30 x 25	1580.0	830.0	0.829	1.146
150	81D151M385KB2D	30 x 30	1130.0	600.0	1.037	1.427
220	81D221M385KC2D	30 x 35	852.0	450.0	1.268	1.732
270	81D271M385KD2D	30 x 40	670.0	360.0	1.488	2.037
330	81D331M385KE2D	30 x 50	500.0	265.0	1.878	2.586
220	81D221M385MB2D	35 x 30	880.0	460.0	1.305	1.805
270	81D271M385MC2D	35 x 35	660.0	350.0	1.598	2.183
330	81D331M385MD2D	35 x 40	510.0	270.0	1.891	2.598
470	81D471M385ME2D	35 x 50	380.0	200.0	2.379	3.269
560	81D561M385MF2D	35 x 63	288.0	150.0	3.037	4.209
820	81D821M385MG2D	35 x 80	210.0	110.0	3.818	5.282
400 VOLTS DC WORKING; 450 VOLTS DC SURGE						
47	81D470M400HA2D	22 x 25	5110.0	2710.0	0.414	0.549
68	81D680M400HB2D	22 x 30	3550.0	1890.0	0.536	0.707
100	81D101M400HD2D	22 x 40	2420.0	1290.0	0.768	1.012
68	81D680M400JA2D	25 x 25	4230.0	2250.0	0.536	0.707
100	81D101M400JB2D	25 x 30	2920.0	1550.0	0.683	0.902
120	81D121M400JC2D	25 x 35	2420.0	1290.0	0.817	1.085
150	81D151M400JD2D	25 x 40	1650.0	880.0	1.000	1.1329
220	81D221M400JE2D	25 x 50	1320.0	710.0	1.207	1.632
100	81D101M400KA2D	30 x 25	2420.0	1290.0	0.744	0.988
150	81D151M400KB2D	30 x 30	1650.0	880.0	0.927	1.220
180	81D181M400KC2D	30 x 35	1320.0	710.0	1.146	1.500
220	81D221M400KD2D	30 x 40	1110.0	580.0	1.476	1.781
330	81D331M400KE2D	30 x 50	730.0	390.0	1.683	2.244
180	81D181M400MB2D	35 x 30	1320.0	710.0	1.183	1.573
270	81D271M400MC2D	35 x 35	1110.0	580.0	1.415	1.866
330	81D331M400MD2D	35 x 40	730.0	390.0	1.695	2.257
390	81D391M400ME2D	35 x 50	610.0	320.0	2.110	2.818
560	81D561M400MF2D	35 x 63	420.0	220.0	2.757	3.647
820	81D821M400MG2D	35 x 80	350.0	180.0	3.440	4.526

+85°C General Purpose Snap Mount Aluminum Capacitors

L65-15

Features —

- **Maximum CV**
- **General Purpose Design**
- **Wide Voltage Range**
- **Molded Cover Available in 2 or 3 Terminal Design with Standoffs**
- **Replaces Type 82D**

General Specifications —

Operating Temperature: −40°C to +85°C.

Voltage Range: 6.3 - 500 VDC.

Capacitance Range: 33μF - 270,000μF.

Capacitance Tolerance: ±20%.

Case Size Range: 22 x 25mm - 40 x 80mm.

Termination: See outline drawings.

Life Validation Test: 2000 hrs @ +85°C:
- Δ CAP ≤ 15% from initial measurement.
- Δ ESR ≤ 1.5x initial specified limit.
- Δ DCL ≤ initial specified limit.

Shelf Test: 500 hrs @ +85°C:
- Δ CAP ≤ 15% from initial measurement.
- Δ ESR ≤ 1.3x initial specified limit.
- Δ DCL ≤ 2x initial specified limit.

DC Leakage Current: 5 min. charge time.
$I = K\sqrt{CV}$
K = 4.0 @ +25°C
I in μa, C in μF, V in Volts

Ripple Current Multipliers:

TEMPERATURE

Ambient Temp.	+55°C	+65°C	+75°C	+85°C
Multipliers	2.0	1.7	1.4	1.0

FREQUENCY (HZ)

Rated VDC	50-60	300-1000	Above 1000
16-49	0.85	1.10	1.15
50-199	0.83	1.15	1.20
200-500	0.80	1.30	1.40

Performance Characteristics —

SEE PAGE 2.

Catalog Numbering System

82DA 123 M 6R3 HA 2 D

LEAD CODE. D = 2 PIN SNAP IN (Standard).
SEE TERMINAL CONFIGURATIONS PAGE 112
FOR LEAD CODE OPTIONS.

CASE STYLE. 2 = PVC INSULATING SLEEVE (Standard).
5 = PVC SLEEVE WITH RESIN END SEAL.
(Required for exposure to halogenated cleaning solvents).

CASE CODE. SEE DIMENSIONS.

DC VOLTAGE RATING. EXPRESSED IN VOLTS. AN 'R' INDICATES A DECIMAL POINT. FOR EXAMPLE, 6R3 = 6.3 VOLTS.

CAPACITANCE TOLERANCE. M = ±20%.

CAPACITANCE. EXPRESSED IN MICROFARADS. THE FIRST TWO DIGITS ARE SIGNIFICANT FIGURES, THE THIRD IS THE NUMBER OF ZEROS.

TYPE NUMBER. IDENTIFIES THE BASIC CAPACITOR DESIGN.

DIMENSIONS

	MILLIMETERS		INCHES		STYLE 2
CASE CODE	DIAMETER D +1/-0	LENGTH L ± 2	DIAMETER D, +0.04/-0	LENGTH L, ±0.08	TYPICAL WEIGHT GRAMS
HA	22	25	0.87	1.00	16
HB	22	30	0.87	1.18	19
HD	22	40	0.87	1.57	24
JA	25	25	1.00	1.00	20
JB	25	30	1.00	1.18	24
JC	25	35	1.00	1.38	27
JD	25	40	1.00	1.57	31
JE	25	50	1.00	2.00	38
KA	30	25	1.18	1.00	30
KB	30	30	1.18	1.18	35
KC	30	35	1.18	1.38	39
KD	30	40	1.18	1.57	44
KE	30	50	1.18	2.00	53
MB	35	30	1.38	1.18	48
MC	35	35	1.38	1.38	54
MD	35	40	1.38	1.57	61
ME	35	50	1.38	2.00	74
MF	35	63	1.38	2.50	91
MG	35	80	1.38	3.18	113
NA	40	25	1.58	1.00	48
NB	40	30	1.58	1.18	58
NC	40	35	1.58	1.38	66
ND	40	40	1.58	1.57	81
NE	40	50	1.58	2.00	103
NF	40	63	1.58	2.50	128
NG	40	80	1.58	3.18	183

STANDARD RATINGS

µF	Catalog Number	Nominal Case Size Millimeters D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-40kHz	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-40kHz
6.3 VOLTS DC WORKING; 8 VOLTS SURGE						
12000	82DA123M6R3HA2D	22 x 25	87.0	68.0	2.23	2.52
18000	82DA183M6R3HB2D	22 x 30	79.0	61.0	2.47	2.84
27000	82DA273M6R3HD2D	22 x 40	52.0	40.0	3.43	3.90
18000	82DA183M6R3JA2D	25 x 25	73.0	58.0	2.62	2.97
27000	82DA273M6R3JB2D	25 x 30	65.0	50.0	2.97	3.39
33000	82DA333M6R3JC2D	25 x 35	52.0	41.0	3.52	3.94
39000	82DA393M6R3JD2D	25 x 40	42.0	33.0	4.29	4.85
56000	82DA563M6R3JE2D	25 x 50	33.0	26.0	5.09	5.62
27000	82DA273M6R3KA2D	30 x 25	66.0	54.0	3.11	3.48
39000	82DA393M6R3KB2D	30 x 30	51.0	41.0	3.76	4.20
47000	82DA473M6R3KC2D	30 x 35	41.0	33.0	4.42	4.98
68000	82DA683M6R3KD2D	30 x 40	33.0	27.0	5.22	5.77
82000	82DA823M6R3KE2D	30 x 50	27.0	21.0	6.29	7.13
56000	82DA563M6R3MB2D	35 x 30	31.0	25.0	5.37	5.97
68000	82DA683M6R3MC2D	35 x 35	26.0	20.0	6.12	6.94
82000	82DA823M6R3MD2D	35 x 40	21.0	16.3	7.24	8.17
120000	82DA124M6R3ME2D	35 x 50	17.0	13.5	8.66	9.68
150000	82DA154M6R3MF2D	35 x 63	13.3	10.6	10.80	12.20
180000	82DA184M6R3MG2D	35 x 80	11.0	9.0	12.80	14.20
56000	82DA563M6R3NA2F	40 x 25	32.0	25.5	5.52	6.18
68000	82DA683M6R3NB2F	40 x 30	24.0	19.5	6.69	7.41
100000	82DA104M6R3NC2F	40 x 35	19.6	16.0	6.94	7.69
120000	82DA124M6R3ND2F	40 x 40	15.9	13.0	8.04	8.89
180000	82DA184M6R3NE2F	40 x 50	12.7	10.5	9.78	10.76
220000	82DA224M6R3NF2F	40 x 63	10.3	8.5	11.77	12.95
270000	82DA274M6R3NG2F	40 x 80	8.4	7.0	14.32	15.67
10 VOLTS DC WORKING; 12 VOLTS SURGE						
10000	82DA103M010HA2D	22 x 25	92.0	70.0	2.17	2.49
12000	82DA123M010HB2D	22 x 30	85.0	64.0	2.40	2.77
22000	82DA223M010HD2D	22 x 40	54.0	41.0	3.38	3.91
15000	82DA153M010JA2D	25 x 25	74.0	57.0	2.62	3.01
18000	82DA183M010JB2D	25 x 30	67.0	51.0	2.94	3.38
22000	82DA223M010JC2D	25 x 35	55.0	42.0	3.42	3.94
27000	82DA273M010JD2D	25 x 40	44.4	34.0	4.15	4.74
39000	82DA393M010JE2D	25 x 50	34.6	26.0	4.97	5.79
22000	82DA223M010KA2D	30 x 25	67.0	54.0	3.10	3.47
27000	82DA273M010KB2D	30 x 30	53.0	41.0	3.70	4.20
39000	82DA393M010KC2D	30 x 35	43.0	34.0	4.34	4.87
47000	82DA473M010KD2D	30 x 40	34.7	27.0	5.10	5.77
56000	82DA563M010KE2D	30 x 50	27.7	21.0	6.29	7.13
39000	82DA393M010MB2D	35 x 30	33.0	26.0	5.21	5.85
47000	82DA473M010MC2D	35 x 35	27.0	21.0	6.05	6.87
56000	82DA563M010MD2D	35 x 40	22.0	17.0	7.00	7.96
82000	82DA823M010ME2D	35 x 50	17.1	13.4	8.62	9.73
100000	82DA104M010MF2D	35 x 63	14.1	11.0	10.50	11.90
150000	82DA154M010MG2D	35 x 80	11.1	9.0	12.80	14.10
47000	82DA473M010NA2F	40 x 25	32.2	25.7	5.50	6.15
56000	82DA563M010NB2F	40 x 30	24.5	19.6	6.61	7.40
68000	82DA683M010NC2F	40 x 35	20.0	16.1	6.87	7.66
82000	82DA823M010ND2F	40 x 40	16.3	13.1	7.94	8.86
120000	82DA124M010NE2F	40 x 50	13.0	10.5	9.67	10.76
150000	82DA154M010NF2F	40 x 63	10.5	8.5	11.65	12.95
220000	82DA224M010NG2F	40 x 80	8.5	7.0	14.22	15.67

STANDARD RATINGS

µF	Catalog Number	Nominal Case Size Millimeters D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-40kHz	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-40kHz
16 VOLTS DC WORKING; 20 VOLTS SURGE						
6800	82DA682M016HA2D	22 x 25	96.0	71.0	2.12	2.46
10000	82DA103M016HB2D	22 x 30	86.0	63.0	2.38	2.80
15000	82DA153M016HD2D	22 x 40	57.7	42.0	3.25	3.83
10000	82DA103M016JA2D	25 x 25	77.0	58.0	2.57	2.97
12000	82DA123M016JB2D	25 x 30	71.0	53.0	2.85	3.29
15000	82DA153M016JC2D	25 x 35	58.0	43.0	3.33	3.87
22000	82DA223M016JD2D	25 x 40	44.8	33.0	4.15	4.85
27000	82DA273M016JE2D	25 x 50	35.0	26.0	4.89	5.69
15000	82DA153M016KA2D	30 x 25	67.7	54.0	3.07	3.47
22000	82DA223M016KB2D	30 x 30	53.7	41.0	3.70	4.20
27000	82DA273M016KC2D	30 x 35	43.8	33.0	4.27	4.98
33000	82DA333M016KD2D	30 x 40	35.3	27.0	5.00	5.77
39000	82DA393M016KE2D	30 x 50	28.0	21.8	6.12	6.89
27000	82DA273M016MB2D	35 x 30	35.0	26.0	5.05	5.85
33000	82DA333M016MC2D	35 x 35	28.0	21.0	5.96	6.87
47000	82DA473M016MD2D	35 x 40	23.0	17.0	7.29	8.48
56000	82DA563M016ME2D	35 x 50	17.5	13.3	8.51	9.78
82000	82DA823M016MF2D	35 x 63	14.0	11.0	10.60	11.90
100000	82DA104M016MG2D	35 x 80	11.2	9.0	12.70	14.10
27000	82DA273M016NA2F	40 x 25	33.3	25.8	5.41	6.14
39000	82DA393M016NB2F	40 x 30	25.4	19.7	6.50	7.38
47000	82DA473M016NC2F	40 x 35	20.7	16.1	6.76	7.66
56000	82DA563M016ND2F	40 x 40	16.8	13.2	7.82	8.83
82000	82DA823M016NE2F	40 x 50	13.4	10.6	9.53	10.71
100000	82DA104M016NF2F	40 x 63	10.8	8.6	11.49	12.87
150000	82DA154M016NG2F	40 x 80	8.8	7.0	13.97	15.67
25 VOLTS DC WORKING; 30 VOLTS SURGE						
4700	82DA472M025HA2D	22 x 25	97.5	74.2	2.10	2.41
6800	82DA682M025HB2D	22 x 30	73.5	56.1	2.57	2.94
10000	82DA103M025HD2D	22 x 40	47.8	36.7	3.55	4.06
6800	82DA682M025JA2D	25 x 25	83.8	60.0	2.48	2.93
8200	82DA822M025JB2D	25 x 30	63.4	47.0	3.03	3.49
12000	82DA123M025JC2D	25 x 35	51.4	38.0	3.56	4.09
15000	82DA153M025JD2D	25 x 40	41.5	31.0	4.22	4.96
18000	82DA183M025JE2D	25 x 50	32.7	24.0	5.14	5.96
10000	82DA103M025KA2D	30 x 25	71.0	54.0	3.00	3.47
12000	82DA123M025KB2D	30 x 30	54.0	41.0	3.70	4.20
18000	82DA183M025KC2D	30 x 35	44.0	33.0	4.27	4.98
22000	82DA223M025KD2D	30 x 40	36.4	27.0	5.00	5.77
27000	82DA273M025KE2D	30 x 50	28.1	22.0	6.12	6.89
18000	82DA183M025MB2D	35 x 30	31.5	24.6	5.32	6.02
22000	82DA223M025MC2D	35 x 35	25.5	20.0	6.22	7.04
27000	82DA273M025MD2D	35 x 40	20.6	16.2	7.24	8.16
39000	82DA393M025ME2D	35 x 50	16.3	12.9	8.51	9.87
47000	82DA473M025MF2D	35 x 63	13.0	10.0	10.60	12.50
68000	82DA683M025MG2D	35 x 80	10.4	8.3	12.70	14.10
22000	82DA223M025NA2F	40 x 25	41.3	34.2	4.85	5.33
27000	82DA273M025NB2F	40 x 30	31.3	25.9	5.85	6.43
33000	82DA333M025NC2F	40 x 35	25.4	21.1	6.10	6.69
47000	82DA473M025ND2F	40 x 40	20.5	17.1	7.08	7.75
56000	82DA563M025NE2F	40 x 50	16.2	13.5	9.02	9.49
68000	82DA683M025NF2F	40 x 63	12.9	10.8	10.51	11.49
100000	82DA104M025NG2F	40 x 80	10.3	8.7	12.91	14.05

STANDARD RATINGS

µF	Catalog Number	Nominal Case Size Millimeters D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-40kHz	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-40kHz
35 VOLTS DC WORKING; 40 VOLTS SURGE						
3300	82DA332M035HA2D	22 x 25	105.0	75.0	2.03	2.39
4700	82DA472M035HB2D	22 x 30	79.0	56.6	2.48	2.94
6800	82DA682M035HD2D	22 x 40	51.0	37.0	3.44	4.06
4700	82DA472M035JA2D	25 x 25	89.0	62.0	2.42	2.86
5600	82DA562M035JB2D	25 x 30	67.0	47.0	2.94	3.49
8200	82DA822M035JC2D	25 x 35	55.0	38.0	3.46	4.09
10000	82DA103M035JD2D	25 x 40	43.8	30.0	4.08	5.08
12000	82DA123M035JE2D	25 x 50	34.4	24.0	5.01	5.96
6800	82DA682M035KA2D	30 x 25	75.0	540.0	2.92	3.42
10000	82DA103M035KB2D	30 x 30	57.0	41.0	3.60	4.20
12000	82DA123M035KC2D	30 x 35	46.6	33.0	4.20	4.98
15000	82DA153M035KD2D	30 x 40	37.7	27.0	4.89	5.77
18000	82DA183M035KE2D	30 x 50	30.5	22.0	5.96	6.89
12000	82DA123M035MB2D	35 x 30	33.2	24.0	5.18	6.10
15000	82DA153M035MC2D	35 x 35	26.9	20.0	6.06	7.04
18000	82DA183M035MD2D	35 x 40	21.7	16.3	7.05	8.13
27000	82DA273M035ME2D	35 x 50	17.1	12.9	8.17	9.87
33000	82DA333M035MF2D	35 x 63	13.6	10.0	10.20	12.50
47000	82DA473M035MG2D	35 x 80	10.8	8.3	12.20	14.10
15000	82DA153M035NA2F	40 x 25	42.1	34.0	4.81	5.35
18000	82DA183M035NB2F	40 x 30	31.9	25.8	5.80	6.45
22000	82DA223M035NC2F	40 x 35	25.8	21.0	6.05	6.71
27000	82DA273M035ND2F	40 x 40	20.9	17.0	7.01	7.78
39000	82DA393M035NE2F	40 x 50	16.4	13.4	8.61	9.53
56000	82DA563M035NF2F	40 x 63	13.1	10.7	10.43	11.54
68000	82DA683M035NG2F	40 x 80	10.5	8.6	12.79	14.13
50 VOLTS DC WORKING; 63 VOLTS SURGE						
2200	82DA222M050HA2D	22 x 25	115.0	76.0	1.94	2.39
3300	82DA332M050HB2D	22 x 30	86.0	57.0	2.38	2.92
4700	82DA472M050HD2D	22 x 40	56.0	37.3	3.30	4.02
3300	82DA332M050JA2D	25 x 25	96.0	62.0	2.33	2.86
3900	82DA392M050JB2D	25 x 30	83.0	48.0	2.84	3.49
5600	82DA562M050JC2D	25 x 35	59.0	38.0	3.34	4.17
6800	82DA682M050JD2D	25 x 40	47.0	31.0	3.91	4.96
8200	82DA822M050JE2D	25 x 50	36.8	24.0	4.85	5.96
4700	82DA472M050KA2D	30 x 25	85.0	54.0	2.73	3.42
6800	82DA682M050KB2D	30 x 30	65.0	41.0	3.35	4.20
8200	82DA822M050KC2D	30 x 35	53.0	33.0	3.89	4.98
10000	82DA103M050KD2D	30 x 40	42.4	27.7	4.54	5.61
12000	82DA123M050KE2D	30 x 50	33.0	22.0	5.69	6.89
8200	82DA822M050MB2D	35 x 30	35.7	24.0	4.96	6.10
10000	82DA103M050MC2D	35 x 35	28.9	20.0	5.85	7.04
12000	82DA123M050MD2D	35 x 40	23.3	16.0	6.81	8.21
18000	82DA183M050ME2D	35 x 50	18.3	13.0	7.60	9.87
22000	82DA223M050MF2D	35 x 63	14.5	10.4	9.53	12.20
33000	82DA333M050MG2D	35 x 80	11.5	8.4	11.40	14.10
10000	82DA103M050NA2F	40 x 25	43.5	33.9	4.73	5.36
12000	82DA123M050NB2F	40 x 30	32.9	25.7	5.71	6.51
15000	82DA153M050NC2F	40 x 35	26.7	20.9	5.95	6.72
22000	82DA223M050ND2F	40 x 40	21.5	16.9	6.91	7.80
27000	82DA273M050NE2F	40 x 50	16.9	13.4	8.48	9.53
33000	82DA333M050NF2F	40 x 63	13.5	10.7	10.27	11.54
47000	82DA473M050NG2F	40 x 80	10.8	8.6	12.61	14.13

STANDARD RATINGS

µF	Catalog Number	Nominal Case Size Millimeters D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-40kHz	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-40kHz
63 VOLTS DC WORKING; 79 VOLTS SURGE						
1500	82DA152M063HA2D	22 x 25	135.0	75.0	1.79	2.39
1800	82DA182M063HB2D	22 x 30	102.0	58.0	2.19	2.87
2700	82DA272M063HD2D	22 x 40	65.0	37.5	3.04	3.98
1800	82DA182M063JA2D	25 x 25	111.0	63.0	2.16	2.86
2700	82DA272M063JB2D	25 x 30	83.1	46.0	2.64	3.54
3300	82DA332M063JC2D	25 x 35	67.1	38.0	3.11	4.09
3900	82DA392M063JD2D	25 x 40	53.8	30.0	3.69	5.08
5600	82DA562M063JE2D	25 x 50	42.0	24.0	4.54	5.96
2700	82DA272M063KA2D	30 x 25	90.0	54.0	2.68	3.42
3900	82DA392M063KB2D	30 x 30	68.0	41.0	3.28	4.20
4700	82DA472M063KC2D	30 x 35	55.0	33.0	3.84	4.98
6800	82DA682M063KD2D	30 x 40	44.0	27.0	4.47	5.77
8200	82DA822M063KE2D	30 x 50	34.0	22.0	5.56	6.89
5600	82DA562M063MB2D	35 x 30	41.1	24.0	4.66	6.10
6800	82DA682M063MC2D	35 x 35	33.2	20.0	5.45	7.04
8200	82DA822M063MD2D	35 x 40	26.6	16.0	6.37	8.21
12000	82DA123M063ME2D	35 x 50	20.8	13.0	7.43	9.87
15000	82DA153M063MF2D	35 x 63	16.4	10.4	9.26	12.30
18000	82DA183M063MG2D	35 x 80	12.9	8.4	11.30	14.10
5600	82DA562M063NA2F	40 x 25	46.8	33.8	4.56	5.37
8200	82DA822M063NB2F	40 x 30	35.3	25.6	5.51	6.47
10000	82DA103M063NC2F	40 x 35	28.6	20.8	5.75	6.74
12000	82DA123M063ND2F	40 x 40	23.0	16.8	6.69	7.82
18000	82DA183M063NE2F	40 x 50	18.1	13.3	8.20	9.56
22000	82DA223M063NF2F	40 x 63	14.3	10.6	9.98	11.60
27000	82DA273M063NG2F	40 x 80	11.4	8.6	12.28	14.13
100 VOLTS DC WORKING; 125 VOLTS SURGE						
560	82DA561M100HA2D	22 x 25	271.0	141.0	1.26	1.75
820	82DA821M100HB2D	22 x 30	202.0	105.0	1.55	2.15
1200	82DA122M100HD2D	22 x 40	128.0	68.0	2.17	3.00
820	82DA821M100JA2D	25 x 25	209.0	113.0	1.57	2.14
1000	82DA102M100JB2D	25 x 30	156.0	85.0	1.93	2.62
1200	82DA122M100JC2D	25 x 35	125.0	68.0	2.28	3.09
1800	82DA182M100JD2D	25 x 40	100.0	55.0	2.69	3.99
2200	82DA222M100JE2D	25 x 50	77.0	42.0	3.37	4.52
1200	82DA122M100KA2D	30 x 25	158.0	86.0	2.02	2.73
1500	82DA152M100KB2D	30 x 30	119.0	66.0	2.46	3.31
2200	82DA222M100KC2D	30 x 35	95.0	52.0	2.91	3.95
2700	82DA272M100KD2D	30 x 40	76.0	42.0	3.41	4.62
3300	82DA332M100KE2D	30 x 50	59.0	33.0	4.25	5.69
2200	82DA222M100MB2D	35 x 30	77.0	41.8	3.41	4.62
2700	82DA272M100MC2D	35 x 35	62.0	33.6	4.01	5.42
3300	82DA332M100MD2D	35 x 40	49.0	26.9	4.70	6.33
4700	82DA472M100ME2D	35 x 50	38.0	20.9	5.23	7.58
5600	82DA562M100MF2D	35 x 63	29.0	16.4	6.46	9.57
8200	82DA822M100MG2D	35 x 80	22.4	12.8	8.09	11.50
2200	82DA222M100NA2F	40 x 25	80.0	46.5	3.50	4.57
3300	82DA332M100NB2F	40 x 30	60.0	35.0	4.25	5.53
3900	82DA392M100NC2F	40 x 35	48.0	28.3	4.45	5.78
5600	82DA562M100ND2F	40 x 40	37.9	22.7	5.21	6.73
6800	82DA682M100NE2F	40 x 50	29.3	17.7	6.44	8.29
8200	82DA822M100NF2F	40 x 63	22.8	14.0	7.90	10.09
12000	82DA123M100NG2F	40 x 80	17.8	11.1	9.82	12.44

STANDARD RATINGS

µF	Catalog Number	Nominal Case Size Millimeters D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-40kHz	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-40kHz
160 VOLTS DC WORKING; 200 VOLTS SURGE						
270	82DA271M160HA2D	22 x 25	656.0	345.0	0.86	1.19
330	82DA331M160HB2D	22 x 30	487.0	256.0	1.06	1.46
560	82DA561M160HD2D	22 x 40	305.0	161.0	1.50	2.06
330	82DA331M160JA2D	25 x 25	475.0	255.0	1.11	1.52
470	82DA471M160JB2D	25 x 30	353.0	190.0	1.36	1.86
560	82DA561M160JC2D	25 x 35	281.0	152.0	1.62	2.20
680	82DA681M160JD2D	25 x 40	221.0	120.0	1.91	2.60
1000	82DA102M160JE2D	25 x 50	169.0	92.0	2.41	3.27
560	82DA561M160KA2D	30 x 25	341.0	192.0	1.47	1.96
680	82DA681M160KB2D	30 x 30	253.0	143.0	1.79	2.38
820	82DA821M160KC2D	30 x 35	202.0	115.0	2.12	2.82
1200	82DA122M160KD2D	30 x 40	160.0	91.0	2.50	3.32
1500	82DA152M160KE2D	30 x 50	122.0	70.0	3.13	4.14
1000	82DA102M160MB2D	35 x 30	209.0	125.0	2.20	2.85
1200	82DA122M160MC2D	35 x 35	167.0	100.0	2.59	3.35
1500	82DA152M160MD2D	35 x 40	132.0	80.0	3.05	3.93
1800	82DA182M160ME2D	35 x 50	107.0	61.0	3.65	4.72
2700	82DA272M160MF2D	35 x 63	78.0	47.0	4.64	5.99
3300	82DA332M160MG2D	35 x 80	60.0	36.5	5.72	7.31
1000	82DA102M160NA2F	40 x 25	169.0	96.0	2.55	3.40
1500	82DA152M160NB2F	40 x 30	126.0	71.0	3.11	4.14
1800	82DA182M160NC2F	40 x 35	100.0	57.0	3.27	4.34
2200	82DA222M160ND2F	40 x 40	79.0	46.0	3.84	5.08
2700	82DA272M160NE2F	40 x 50	61.0	34.6	4.78	6.31
3900	82DA392M160NF2F	40 x 63	47.0	26.7	5.91	7.78
5600	82DA562M160NG2F	40 x 80	35.2	20.6	7.44	9.72
200 VOLTS DC WORKING; 250 VOLTS SURGE						
180	82DA181M200HA2D	22 x 25	750.0	346.0	0.80	1.19
270	82DA271M200HB2D	22 x 30	556.0	255.0	0.99	1.48
390	82DA391M200HD2D	22 x 40	348.0	162.0	1.40	2.06
270	82DA271M200JA2D	25 x 25	540.0	256.0	1.04	1.51
330	82DA331M200JB2D	25 x 30	401.0	191.0	1.28	1.86
470	82DA471M200JC2D	25 x 35	319.0	151.0	1.52	2.22
560	82DA561M200JD2D	25 x 40	252.0	121.0	1.79	2.68
680	82DA681M200JE2D	25 x 50	191.0	91.0	2.26	3.28
390	82DA391M200KA2D	30 x 25	384.0	192.0	1.38	1.96
560	82DA561M200KB2D	30 x 30	286.0	136.0	1.69	2.48
680	82DA681M200KC2D	30 x 35	228.0	107.0	2.00	2.95
820	82DA821M200KD2D	30 x 40	180.0	87.0	2.36	3.41
1200	82DA122M200KE2D	30 x 50	137.0	67.0	2.96	4.23
680	82DA681M200MB2D	35 x 30	233.0	116.0	2.08	2.97
1000	82DA102M200MC2D	35 x 35	186.0	93.0	2.46	3.51
1200	82DA122M200MD2D	35 x 40	147.0	74.0	2.89	4.06
1500	82DA152M200ME2D	35 x 50	112.0	58.0	3.54	5.01
2200	82DA222M200MF2D	35 x 63	86.0	45.0	4.51	6.35
2700	82DA272M200MG2D	35 x 80	66.0	30.0	5.58	7.58
820	82DA821M200NA2F	40 x 25	191.0	96.0	2.41	3.40
1000	82DA102M200NB2F	40 x 30	142.0	72.0	2.93	4.13
1200	82DA122M200NC2F	40 x 35	113.0	57.0	3.08	4.33
1800	82DA182M200ND2F	40 x 40	89.0	46.0	3.62	5.08
2200	82DA222M200NE2F	40 x 50	68.0	34.7	4.51	6.30
2700	82DA272M200NF2F	40 x 63	52.0	26.8	5.58	7.76
3900	82DA392M200NG2F	40 x 80	40.0	20.6	7.03	9.72

STANDARD RATINGS

µF	Catalog Number	Nominal Case Size Millimeters D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-40kHz	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-40kHz
250 VOLTS DC WORKING; 300 VOLTS SURGE						
120	82DA121M250HA2D	22 x 25	899.0	347.0	0.74	1.19
180	82DA181M250HB2D	22 x 30	666.0	258.0	0.91	1.52
270	82DA271M250HD2D	22 x 40	416.0	162.0	1.28	2.12
180	82DA181M250JA2D	25 x 25	644.0	256.0	0.96	1.52
270	82DA271M250JB2D	25 x 30	477.0	189.0	1.17	1.94
330	82DA331M250JC2D	25 x 35	380.0	151.0	1.39	2.31
390	82DA391M250JD2D	25 x 40	299.0	120.0	1.65	2.79
560	82DA561M250JE2D	25 x 50	227.0	92.0	2.08	3.35
270	82DA271M250KA2D	30 x 25	453.0	192.0	1.27	2.02
390	82DA391M250KB2D	30 x 30	336.0	135.0	1.55	2.58
470	82DA471M250KC2D	30 x 35	267.0	109.0	1.85	3.03
560	82DA561M250KD2D	30 x 40	211.0	87.0	2.18	3.54
820	82DA821M250KE2D	30 x 50	160.0	67.0	2.74	4.41
560	82DA561M250MB2D	35 x 30	270.0	116.0	1.93	3.07
680	82DA681M250MC2D	35 x 35	215.0	94.0	2.28	3.62
820	82DA821M250MD2D	35 x 40	170.0	74.0	2.68	4.26
1000	82DA102M250ME2D	35 x 50	129.0	58.0	3.32	5.21
1500	82DA152M250MF2D	35 x 63	99.0	40.0	4.09	6.49
1800	82DA182M250MG2D	35 x 80	75.0	35.0	4.73	8.01
560	82DA561M250NA2F	40 x 25	224.0	96.0	2.22	3.39
820	82DA821M250NB2F	40 x 30	166.0	71.0	2.70	4.14
1000	82DA102M250NC2F	40 x 35	132.0	57.0	2.85	4.33
1200	82DA122M250ND2F	40 x 40	104.0	45.0	3.35	5.09
1500	82DA152M250NE2F	40 x 50	79.0	34.0	4.18	6.37
2200	82DA222M250NF2F	40 x 63	60.0	26.9	5.19	7.75
2700	82DA272M250NG2F	40 x 80	46.0	20.7	6.51	9.70
300 VOLTS DC WORKING; 350 VOLTS SURGE						
82	82DA820M300HA2D	22 x 25	2637.0	1650.0	0.43	0.54
120	82DA121M300HB2D	22 x 30	1886.2	1180.5	0.54	0.68
220	82DA221M300HD2D	22 x 40	1134.3	710.0	0.78	0.98
120	82DA121M300JA2D	25 x 25	1889.1	1186.6	0.56	0.70
180	82DA181M300JB2D	25 x 30	1351.4	849.0	0.69	1.13
220	82DA221M300JC2D	25 x 35	1052.0	662.0	0.97	1.26
270	82DA271M300JD2D	25 x 40	813.0	512.0	1.20	1.58
390	82DA391M300JE2D	25 x 50	607.0	382.0	1.46	1.91
180	82DA181M300KA2D	30 x 25	1255.0	796.0	0.76	0.96
270	82DA271M300KB2D	30 x 30	898.0	570.0	0.95	1.20
330	82DA331M300KC2D	30 x 35	700.0	445.0	1.14	1.43
470	82DA471M300KD2D	30 x 40	542.0	344.0	1.36	1.70
560	82DA561M300KE2D	30 x 50	405.0	258.0	1.72	2.16
330	82DA331M300MB2D	35 x 30	713.0	450.0	1.19	1.50
470	82DA471M300MC2D	35 x 35	556.0	350.0	1.42	1.80
560	82DA561M300MD2D	35 x 40	430.0	270.0	1.69	2.13
820	82DA821M300ME2D	35 x 50	322.0	200.0	2.06	2.68
1000	82DA102M300MF2D	35 x 63	242.0	150.0	2.67	3.45
1500	82DA152M300MG2D	35 x 80	181.0	110.0	3.29	4.33
390	82DA391M300NA2F	40 x 25	643.0	407.0	1.31	1.64
560	82DA561M300NB2F	40 x 30	460.0	292.0	1.62	2.04
680	82DA681M300NC2F	40 x 35	358.0	228.0	1.73	2.17
820	82DA821M300ND2F	40 x 40	277.0	176.0	2.05	2.57
1200	82DA122M300NE2F	40 x 50	207.0	132.0	2.58	3.23
1500	82DA152M300NF2F	40 x 63	155.0	99.0	3.23	4.04
2200	82DA222M300NG2F	40 x 80	116.0	74.0	4.09	5.13

STANDARD RATINGS

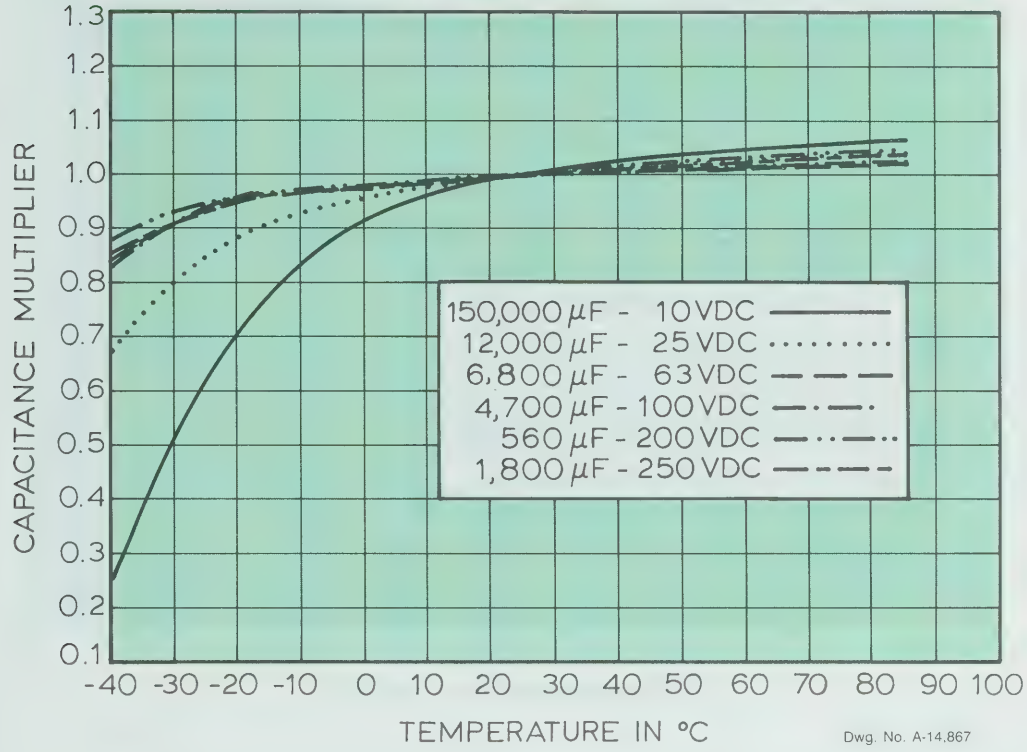
µF	Catalog Number	Nominal Case Size Millimeters D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-40kHz	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-40kHz
350 VOLTS DC WORKING; 400 VOLTS SURGE						
82	82DA820M350HA2D	22 x 25	2700.0	1652.0	0.42	0.54
120	82DA121M350HB2D	22 x 30	1931.0	1182.0	0.53	0.68
180	82DA181M350HD2D	22 x 40	1161.0	711.0	0.76	0.98
120	82DA121M350JA2D	25 x 25	1934.0	1188.0	0.55	0.70
150	82DA151M350JB2D	25 x 30	1383.0	850.0	0.69	0.88
220	82DA221M350JC2D	25 x 35	1077.0	663.0	0.82	1.05
270	82DA271M350JD2D	25 x 40	833.0	512.0	0.99	1.26
330	82DA331M350JE2D	25 x 50	622.0	383.0	1.25	1.60
180	82DA181M350KA2D	30 x 25	1284.0	797.0	0.75	0.96
270	82DA271M350KB2D	30 x 30	919.0	571.0	0.94	1.19
330	82DA331M350KC2D	30 x 35	716.0	445.0	1.13	1.43
390	82DA391M350KD2D	30 x 40	554.0	345.0	1.34	1.70
560	82DA561M350KE2D	30 x 50	414.0	258.0	1.70	2.157
330	82DA331M350MB2D	35 x 30	729.0	458.0	1.18	1.48
390	82DA391M350MC2D	35 x 35	568.0	358.0	1.40	1.77
560	82DA561M350MD2D	35 x 40	440.0	270.0	1.67	2.13
680	82DA681M350ME2D	35 x 50	329.0	200.0	2.00	2.68
1000	82DA102M350MF2D	35 x 63	247.0	150.0	2.57	3.45
1200	82DA122M350MG2D	35 x 80	185.0	115.0	3.20	4.23
390	82DA391M350NA2F	40 x 25	658.0	407.0	1.29	1.64
470	82DA471M350NB2F	40 x 30	471.0	292.0	1.60	2.04
680	82DA681M350NC2F	40 x 35	367.0	228.0	1.71	2.16
820	82DA821M350ND2F	40 x 40	284.0	176.0	2.02	2.57
1000	82DA102M350NE2F	40 x 50	212.0	132.0	2.55	3.23
1500	82DA152M350NF2F	40 x 63	159.0	99.0	3.19	4.04
1800	82DA182M350NG2F	40 x 80	118.0	74.0	4.06	5.13
400 VOLTS DC WORKING; 450 VOLTS SURGE						
68	82DA680M400HA2D	22 x 25	3585.0	2220.0	0.37	0.47
82	82DA820M400HB2D	22 x 30	2563.0	1588.0	0.46	0.59
150	82DA151M400HD2D	22 x 40	1541.0	955.0	0.66	0.84
100	82DA101M400JA2D	25 x 25	2561.0	1591.0	0.48	0.60
120	82DA121M400JB2D	25 x 30	1832.0	1138.0	0.60	0.76
150	82DA151M400JC2D	25 x 35	1426.0	887.0	0.72	0.91
220	82DA221M400JD2D	25 x 40	1102.0	685.0	0.86	1.09
270	82DA271M400JE2D	25 x 50	822.0	512.0	1.09	1.38
150	82DA151M400KA2D	30 x 25	1690.0	1058.0	0.66	0.83
180	82DA181M400KB2D	30 x 30	1209.0	757.0	0.82	1.03
270	82DA271M400KC2D	30 x 35	942.0	590.0	0.98	1.24
330	82DA331M400KD2D	30 x 40	728.0	457.0	1.17	1.48
390	82DA391M400KE2D	30 x 50	544.0	341.0	1.48	1.87
270	82DA271M400MB2D	35 x 30	953.0	602.0	1.03	1.29
330	82DA331M400MC2D	35 x 35	742.0	469.0	1.23	1.54
390	82DA391M400MD2D	35 x 40	574.0	360.0	1.46	1.85
560	82DA561M400ME2D	35 x 50	429.0	270.0	1.73	2.31
680	82DA681M400MF2D	35 x 63	322.0	200.0	2.26	2.99
1000	82DA102M400MG2D	35 x 80	240.0	150.0	2.82	3.71
270	82DA271M400NA2F	40 x 25	866.0	542.0	1.13	1.43
390	82DA391M400NB2F	40 x 30	619.0	388.0	1.40	1.77
470	82DA471M400NC2F	40 x 35	483.0	302.0	1.49	1.88
680	82DA681M400ND2F	40 x 40	373.0	234.0	1.77	2.23
820	82DA821M400NE2F	40 x 50	278.0	175.0	2.22	2.80
1200	82DA122M400NF2F	40 x 63	209.0	131.0	2.78	3.51
1500	82DA152M400NG2F	40 x 80	155.0	98.0	3.54	4.46

STANDARD RATINGS

µF	Catalog Number	Nominal Case Size Millimeters D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-40kHz	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-40kHz
450 VOLTS DC WORKING; 500 VOLTS SURGE						
56	82DA560M450HA2D	22 x 25	3812.0	2222.0	0.36	0.47
68	82DA680M450HB2D	22 x 30	2725.0	1589.0	0.45	0.59
120	82DA121M450HD2D	22 x 40	1637.0	956.0	0.64	0.84
82	82DA820M450JA2D	25 x 25	2722.0	1593.0	0.46	0.60
100	82DA101M450JB2D	25 x 30	1947.0	1139.0	0.58	0.76
120	82DA121M450JC2D	25 x 35	1516.0	887.0	0.69	0.91
180	82DA181M450JD2D	25 x 40	1171.0	686.0	0.83	1.09
220	82DA221M450JE2D	25 x 50	873.0	512.0	1.06	1.38
120	82DA121M450KA2D	30 x 25	1794.0	1059.0	0.64	0.83
150	82DA151M450KB2D	30 x 30	1284.0	758.0	0.79	1.03
220	82DA221M450KC2D	30 x 35	999.0	591.0	0.95	1.24
270	82DA271M450KD2D	30 x 40	773.0	457.0	1.13	1.48
330	82DA331M450KE2D	30 x 50	577.0	341.0	1.44	1.87
220	82DA221M450MB2D	35 x 30	1010.0	602.0	1.00	1.29
270	82DA271M450MC2D	35 x 35	787.0	460.0	1.19	1.56
330	82DA331M450MD2D	35 x 40	609.0	363.0	1.41	1.83
470	82DA471M450ME2D	35 x 50	455.0	272.0	1.68	2.29
560	82DA561M450MF2D	35 x 63	341.0	204.0	2.17	2.95
820	82DA821M450MG2D	35 x 80	254.0	150.0	2.71	3.71
220	82DA221M450NA2F	40 x 25	919.0	542.0	1.09	1.42
330	82DA331M450NB2F	40 x 30	657.0	388.0	1.36	1.77
390	82DA391M450NC2F	40 x 35	512.0	302.0	1.44	1.88
560	82DA561M450ND2F	40 x 40	396.0	234.0	1.71	2.23
680	82DA681M450NE2F	40 x 50	296.0	175.0	2.16	2.80
1000	82DA102M450NF2F	40 x 63	221.0	131.0	2.70	3.51
1200	82DA122M450NG2F	40 x 80	165.0	98.0	3.43	4.46
500 VOLTS DC WORKING; 525 VOLTS SURGE						
33	82DA330M500HA2D	22 x 25	6113.0	3535.0	0.28	0.37
47	82DA470M500HB2D	22 x 30	4369.0	2527.0	0.35	0.46
68	82DA680M500HD2D	22 x 40	2624.0	1519.0	0.51	0.67
47	82DA470M500JA2D	25 x 25	4471.0	2588.0	0.36	0.47
56	82DA560M500JB2D	25 x 30	3196.0	1851.0	0.45	0.59
82	82DA820M500JC2D	25 x 35	2488.0	1441.0	0.54	0.71
100	82DA101M500JD2D	25 x 40	1920.0	1113.0	0.65	0.85
120	82DA121M500JE2D	25 x 50	1432.0	830.0	0.82	1.08
68	82DA680M500KA2D	30 x 25	2887.0	1677.0	0.50	0.66
100	82DA101M500KB2D	30 x 30	2065.0	1200.0	0.62	0.82
120	82DA121M500KC2D	30 x 35	1607.0	935.0	0.75	0.98
150	82DA151M500KD2D	30 x 40	1241.0	722.0	0.89	1.17
220	82DA221M500KE2D	30 x 50	926.0	539.0	1.13	1.49
120	82DA121M500MB2D	35 x 30	1557.0	908.0	0.80	1.05
150	82DA151M500MC2D	35 x 35	1212.0	708.0	0.96	1.26
220	82DA221M500MD2D	35 x 40	936.0	547.0	1.14	1.49
270	82DA271M500ME2D	35 x 50	698.0	408.0	1.29	1.69
390	82DA391M500MF2D	35 x 63	523.0	306.0	1.62	2.12
470	82DA471M500MG2D	35 x 80	389.0	228.0	2.07	2.70
120	82DA121M500NA2F	40 x 25	1444.0	839.0	0.87	1.14
180	82DA181M500NB2F	40 x 30	1032.0	600.0	1.08	1.42
220	82DA221M500NC2F	40 x 35	804.0	467.0	1.15	1.51
330	82DA331M500ND2F	40 x 40	621.0	361.0	1.37	1.79
390	82DA391M500NE2F	40 x 50	463.0	269.0	1.72	2.26
560	82DA561M500NF2F	40 x 63	346.0	202.0	2.16	2.83
680	82DA681M500NG2F	40 x 80	257.0	150.0	2.75	3.60

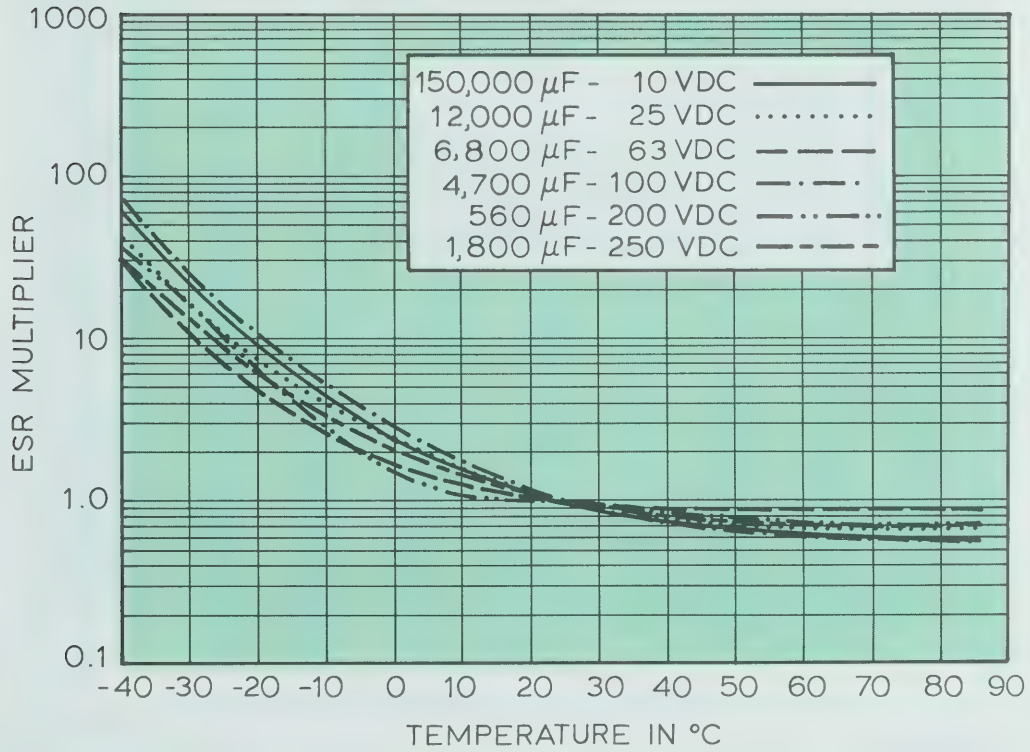
TYPICAL CURVES

TYPE 82DA — TYPICAL CAPACITANCE RATIO VS. TEMPERATURE @ 120 Hz



Dwg. No. A-14,867

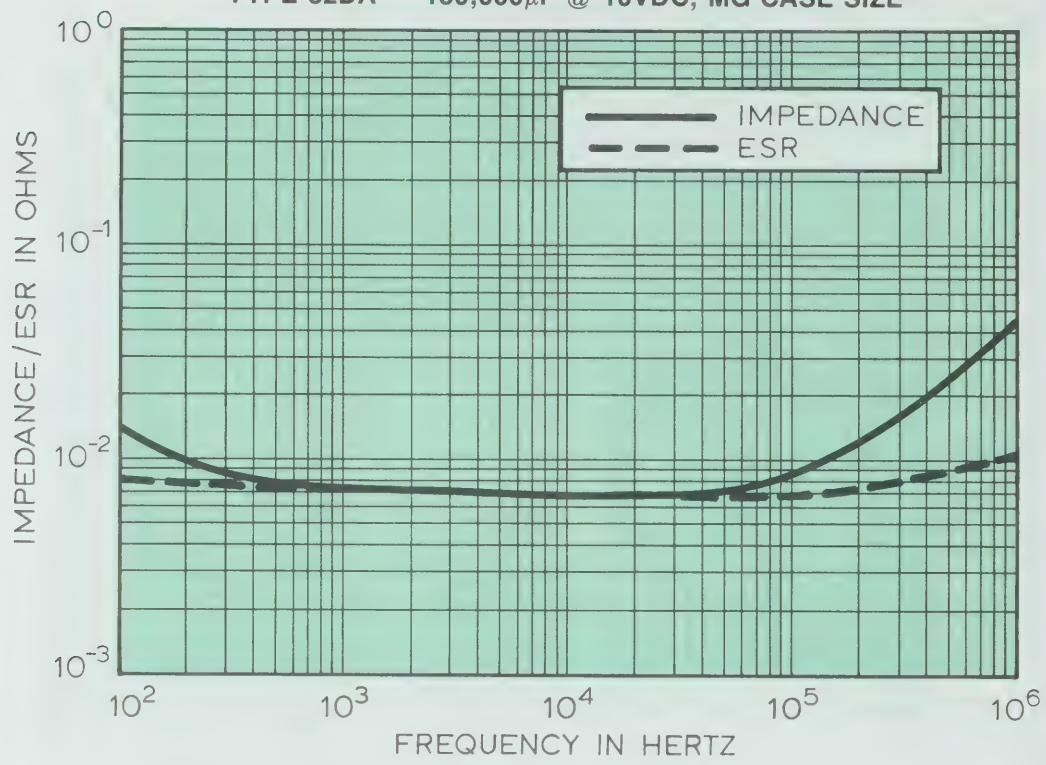
TYPE 82DA — TYPICAL ESR MULTIPLIER VS. TEMPERATURE @ 120 Hz



Dwg. No. A-14,868

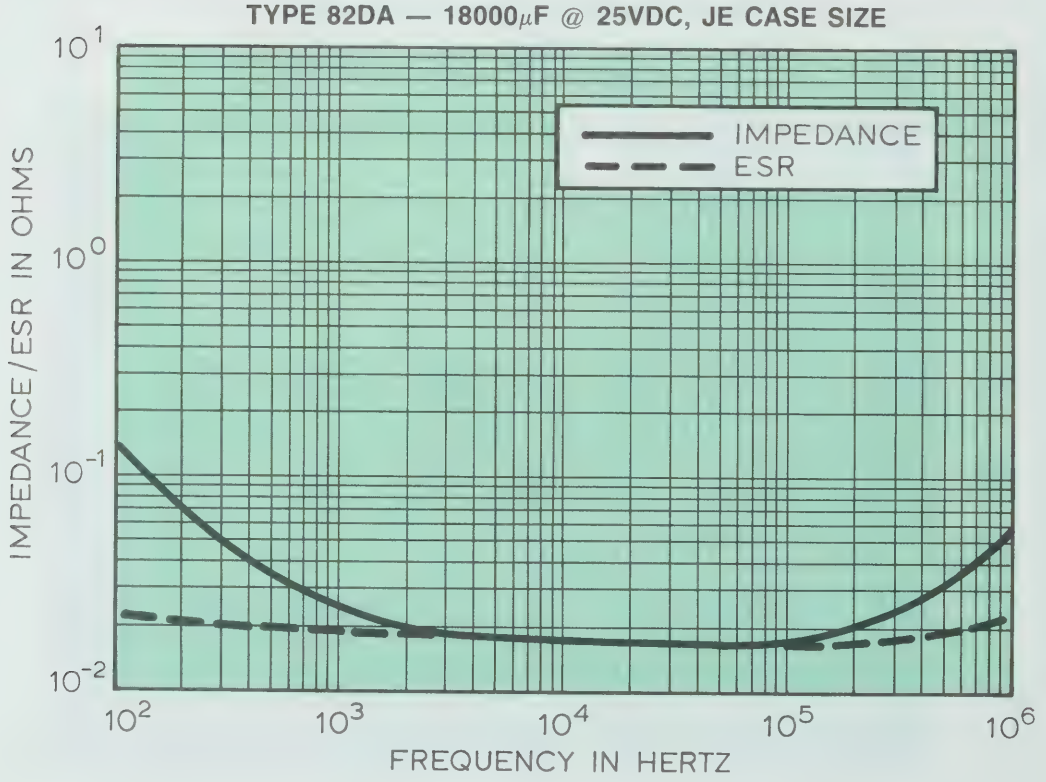
TYPICAL CURVES @ +25°C

TYPE 82DA — 150,000μF @ 10VDC, MG CASE SIZE



Dwg. No. A-14,869

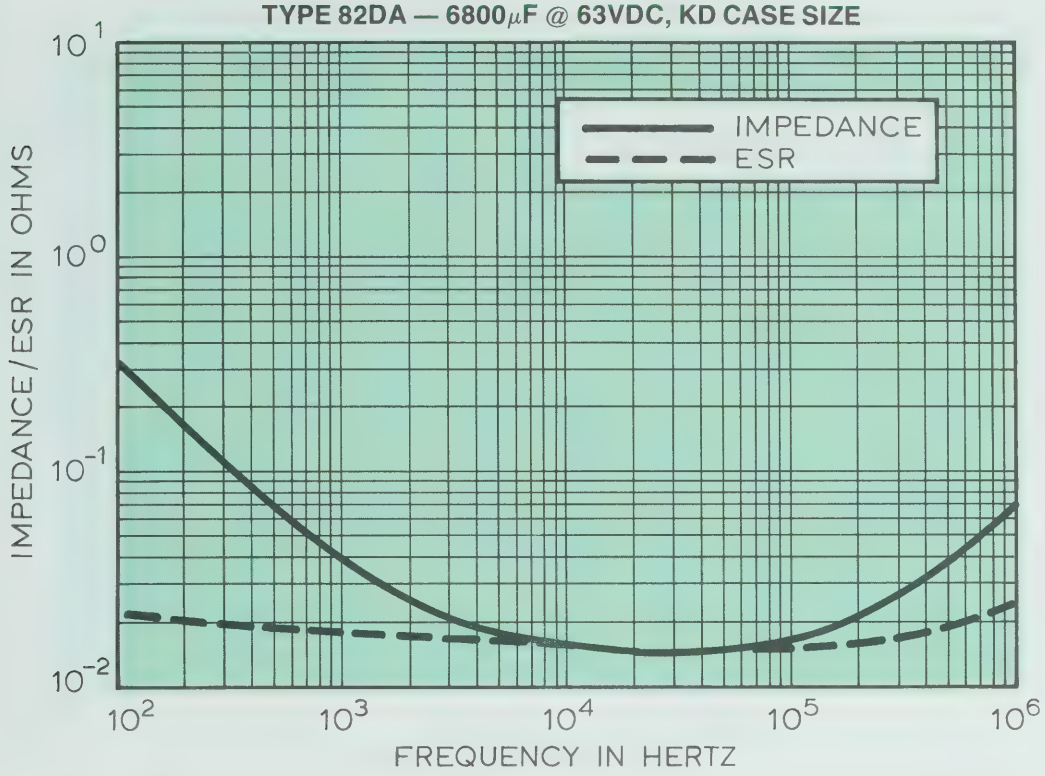
TYPE 82DA — 18000μF @ 25VDC, JE CASE SIZE



Dwg. No. A-14,870

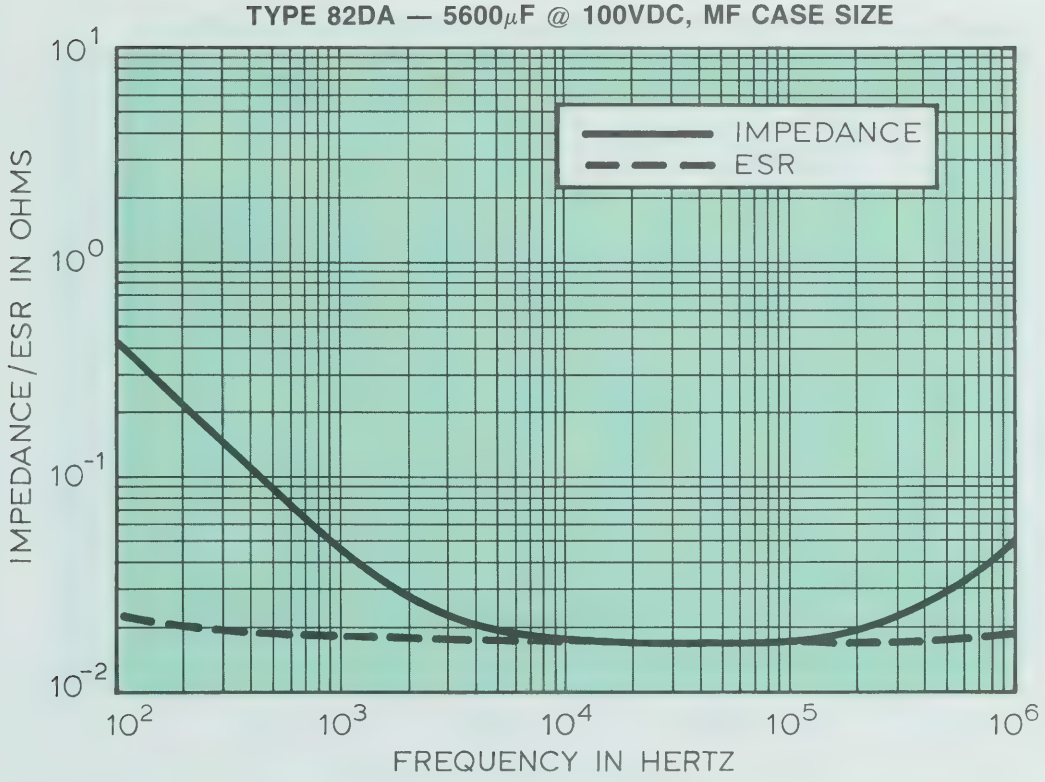
TYPICAL CURVES @ +25°C

TYPE 82DA — 6800μF @ 63VDC, KD CASE SIZE



Dwg. No. A-14,871

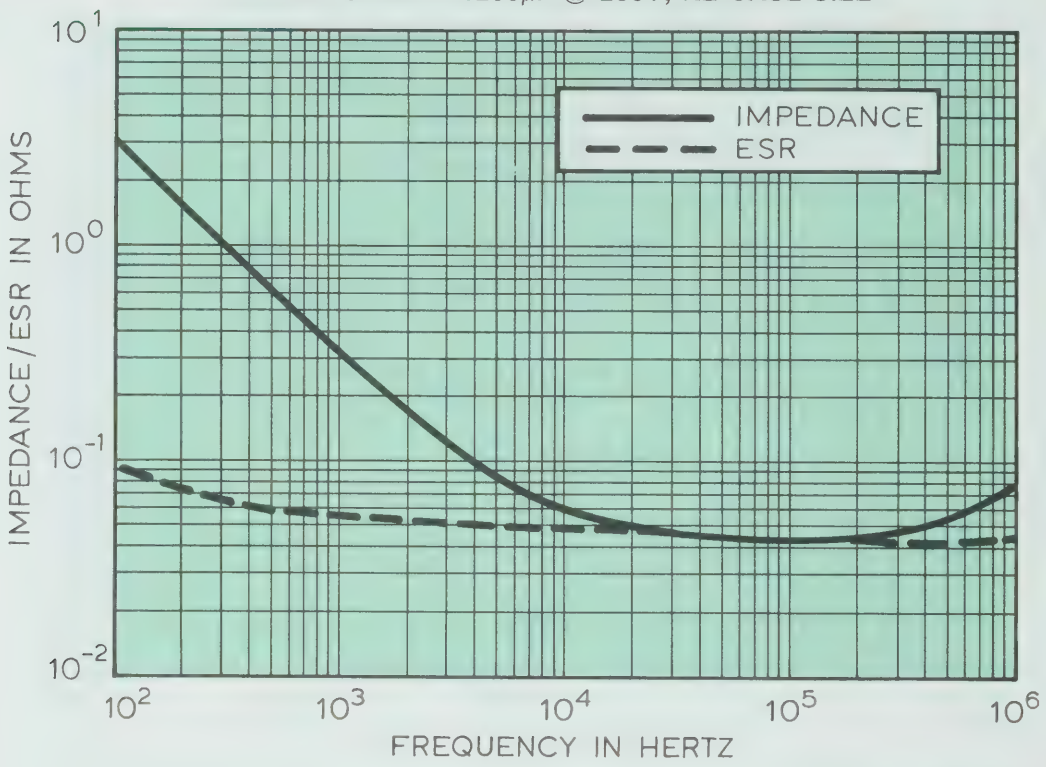
TYPE 82DA — 5600μF @ 100VDC, MF CASE SIZE



Dwg. No. A-14,872

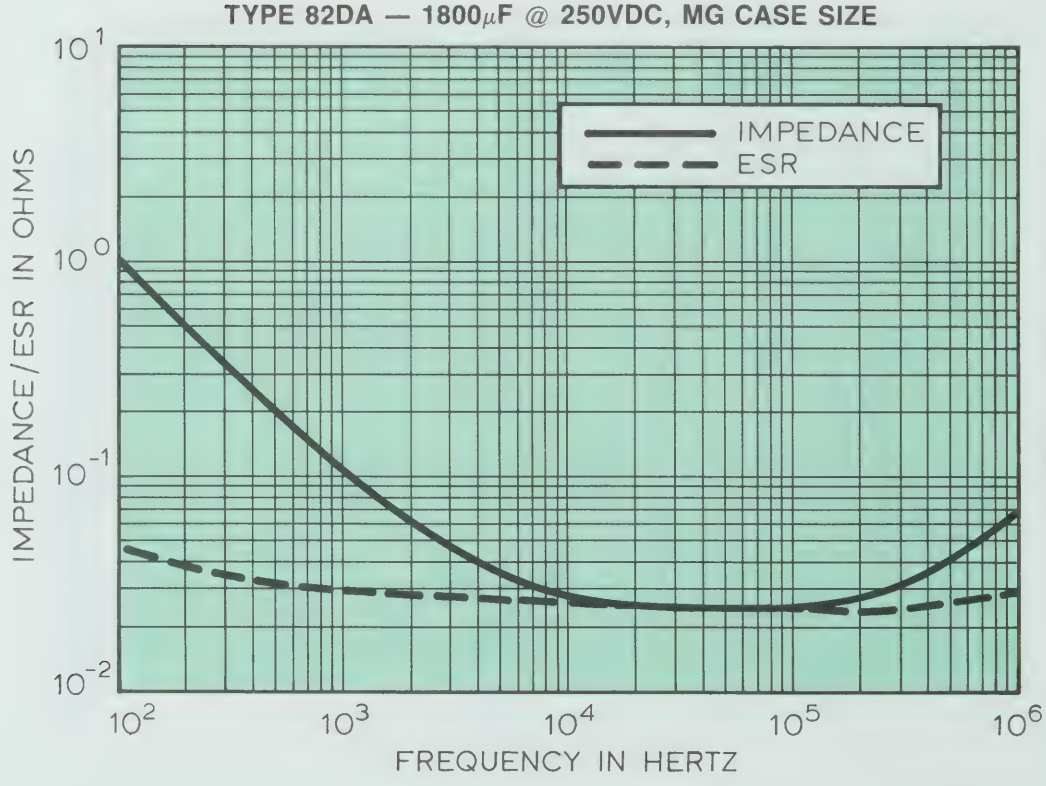
TYPICAL CURVES @ +25°C

TYPE 82DA — 1200μF @ 200V, KE CASE SIZE



Dwg. No. A-14,873

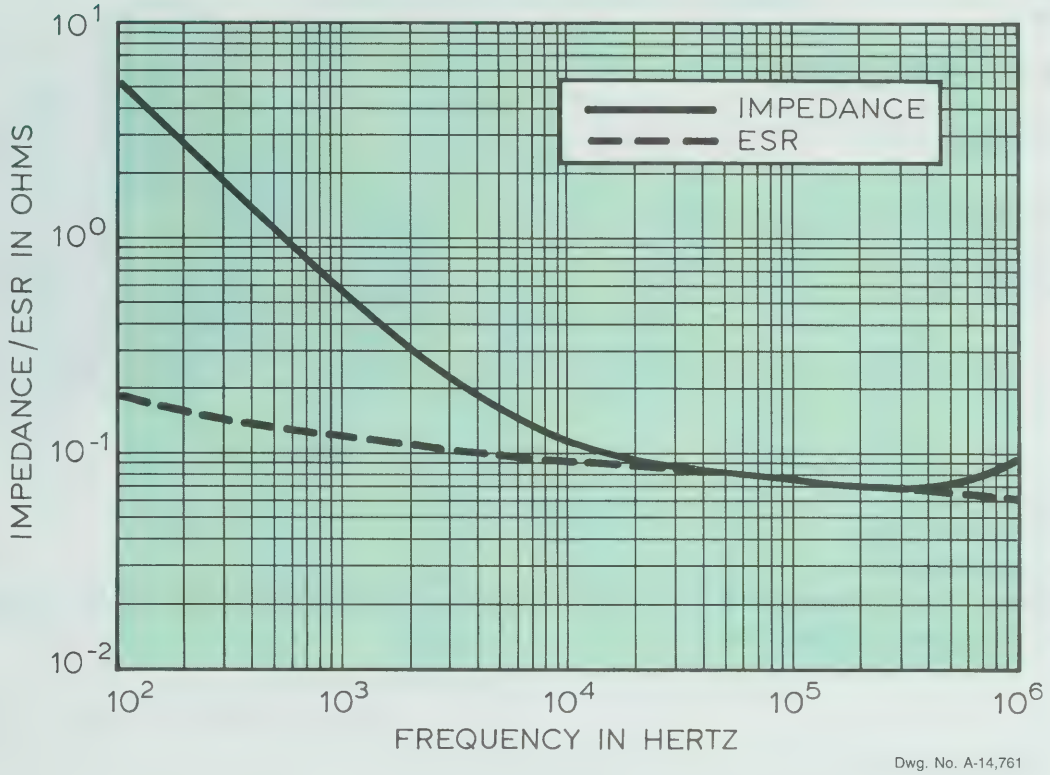
TYPE 82DA — 1800μF @ 250VDC, MG CASE SIZE



Dwg. No. A-14,874

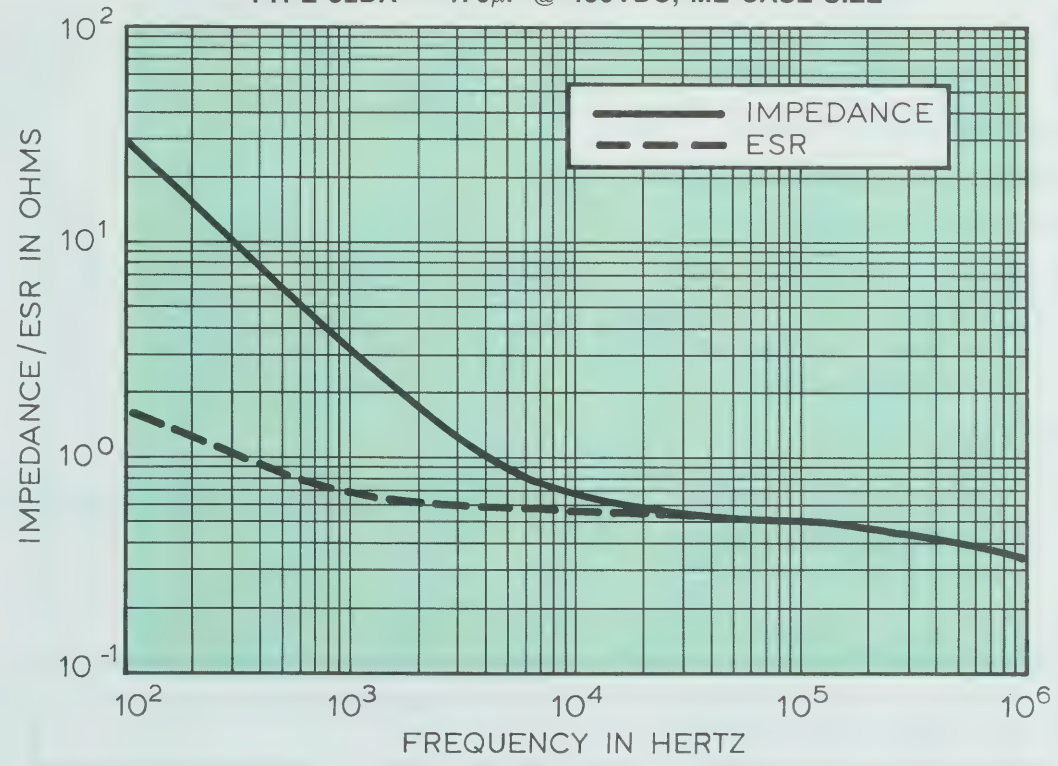
TYPICAL CURVES @ +25°C

TYPE 82DA — 150μF @ 350VDC, JB CASE SIZE



Dwg. No. A-14,761

TYPE 82DA — 470μF @ 450VDC, ME CASE SIZE



Dwg. No. A-14,762

+85°C General Purpose Snap Mount Aluminum Capacitors

L65-14

Features —

- Economical
- General Purpose Design
- Wide Voltage Range
- Molded Cover Available in 2 or 3 Terminal Design with Standoffs

General Specifications —

Operating Temperature: –40°C to +85°C.

Voltage Range: 6.3 - 450 VDC.

Capacitance Range: 39μF - 180,000μF.

Capacitance Tolerance: ±20%.

Case Size Range: 22 x 25mm - 35 x 80mm.

Termination: See outline drawings.

Life Validation Test: 2000 hrs @ +85°C:
- Δ CAP ≤ 15% from initial measurement.
- Δ ESR ≤ 1.5x initial specified limit.
- Δ DCL ≤ initial specified limit.

Shelf Test: 500 hrs @ +85°C:
- Δ CAP ≤ 15% from initial measurement.
- Δ ESR ≤ 1.3x initial specified limit.
- Δ DCL ≤ 2x initial specified limit.

DC Leakage Current: after 5 min. charge.
$I = K\sqrt{CV}$
K = 4.0 @ +25°C
I in μa, C in μF, V in Volts

Ripple Current Multipliers:

TEMPERATURE

Ambient Temp.	+55°C	+65°C	+75°C	+85°C
Multipliers	2.0	1.7	1.4	1.0

FREQUENCY (HZ)

Rated VDC	50-60	300-1000	Above 1000
16-49	0.85	1.10	1.15
50-199	0.83	1.15	1.20
200-450	0.80	1.30	1.40

Performance Characteristics —

SEE PAGE 2.

Note: Type 82D Original Ratings are recommended for replacement applications only. For new designs, see Type 82DA.

Catalog Numbering System

82D 822 M 6R3 HA 2 D

LEAD CODE. D = 2 PIN SNAP IN (Standard).
SEE TERMINAL CONFIGURATION, PAGE 112
FOR LEAD CODE OPTIONS.

CASE STYLE. 2 = PVC INSULATING SLEEVE (Standard).
5 = PVC SLEEVE WITH RESIN END SEAL.
(Required for exposure to halogenated cleaning solvents).

CASE CODE. SEE DIMENSIONS.

DC VOLTAGE RATING. EXPRESSED IN VOLTS. AN 'R' INDICATES A DECIMAL POINT.
FOR EXAMPLE, 6R3 = 6.3 VOLTS.

CAPACITANCE TOLERANCE. M = ±20%.

CAPACITANCE. EXPRESSED IN MICROFARADS. THE FIRST TWO DIGITS ARE SIGNIFICANT FIGURES, THE THIRD IS THE NUMBER OF ZEROS.

TYPE NUMBER. IDENTIFIES THE BASIC CAPACITOR DESIGN.

DIMENSIONS

	MILLIMETERS		INCHES		STYLE 2
CASE CODE	DIAMETER D +1/-0	LENGTH L ± 2	DIAMETER D, +0.04/-0	LENGTH L, ±0.08	TYPICAL WEIGHT (GRAMS)
HA	22	25	0.87	1.00	16
HB	22	30	0.87	1.18	19
HD	22	40	0.87	1.57	24
JA	25	25	1.00	1.00	20
JB	25	30	1.00	1.18	24
JC	25	35	1.00	1.38	27
JD	25	40	1.00	1.57	31
JE	25	50	1.00	2.00	38
KA	30	25	1.18	1.00	30
KB	30	30	1.18	1.18	35
KC	30	35	1.18	1.38	39
KD	30	40	1.18	1.57	44
KE	30	50	1.18	2.00	53
MB	35	30	1.38	1.18	48
MC	35	35	1.38	1.38	54
MD	35	40	1.38	1.57	61
ME	35	50	1.38	2.00	74
MF	35	63	1.38	2.50	91
MG	35	80	1.38	3.18	113

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size Millimeters D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-40k	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-40k
6.3 VOLTS DC WORKING; 8 VOLTS DC SURGE						
8200	82D822M6R3HA2D	22 x 25	87.0	68.0	2.23	2.52
18000	82D183M6R3HB2D	22 x 30	79.0	61.0	2.47	2.84
27000	82D273M6R3HD2D	22 x 40	52.0	40.0	3.43	3.90
12000	82D123M6R3JA2D	25 x 25	73.0	58.0	2.62	2.97
27000	82D273M6R3JB2D	25 x 30	65.0	50.0	2.97	3.39
33000	82D333M6R3JC2D	25 x 35	52.0	41.0	3.52	3.94
39000	82D393M6R3JD2D	25 x 40	42.0	33.0	4.29	4.85
56000	82D563M6R3JE2D	25 x 50	33.0	26.0	5.09	5.62
18000	82D183M6R3KA2D	30 x 25	66.0	54.0	3.11	3.48
39000	82D393M6R3KB2D	30 x 30	51.0	41.0	3.76	4.20
47000	82D473M6R3KC2D	30 x 35	41.0	33.0	4.42	4.98
68000	82D683M6R3KD2D	30 x 40	33.0	27.0	5.22	5.77
82000	82D823M6R3KE2D	30 x 50	27.0	21.0	6.29	7.13
56000	82D563M6R3MB2D	35 x 30	31.0	25.0	5.37	5.97
68000	82D683M6R3MC2D	35 x 35	26.0	20.0	6.12	6.94
82000	82D823M6R3MD2D	35 x 40	21.0	16.3	7.24	8.17
100000	82D104M6R3ME2D	35 x 50	17.0	13.5	8.66	9.68
150000	82D154M6R3MF2D	35 x 63	13.3	10.6	10.80	12.20
180000	82D184M6R3MG2D	35 x 80	11.0	9.0	12.80	14.20
10 VOLTS DC WORKING; 12 VOLTS DC SURGE						
6800	82D682M010HA2D	22 x 25	92.0	70.0	2.17	2.49
12000	82D123M010HB2D	22 x 30	85.0	64.0	2.40	2.77
22000	82D223M010HD2D	22 x 40	54.0	41.0	3.38	3.91
10000	82D103M010JA2D	25 x 25	74.0	57.0	2.62	3.01
18000	82D183M010JB2D	25 x 30	67.0	51.0	2.94	3.38
22000	82D223M010JC2D	25 x 35	55.0	42.0	3.42	3.94
27000	82D273M010JD2D	25 x 40	44.4	34.0	4.15	4.74
39000	82D393M010JE2D	25 x 50	34.6	26.0	4.97	5.79
15000	82D153M010KA2D	30 x 25	67.0	54.0	3.10	3.47
27000	82D273M010KB2D	30 x 30	53.0	41.0	3.70	4.20
39000	82D393M010KC2D	30 x 35	43.0	34.0	4.34	4.87
47000	82D473M010KD2D	30 x 40	34.7	27.0	5.10	5.77
56000	82D563M010KE2D	30 x 50	27.7	21.0	6.29	7.13
39000	82D393M010MB2D	35 x 30	33.0	26.0	5.21	5.85
47000	82D473M010MC2D	35 x 35	27.0	21.0	6.05	6.87
56000	82D563M010MD2D	35 x 40	22.0	17.0	7.00	7.96
82000	82D823M010ME2D	35 x 50	17.1	13.4	8.62	9.73
100000	82D104M010MF2D	35 x 63	14.1	11.0	10.50	11.90
150000	82D154M010MG2D	35 x 80	11.1	9.0	12.80	14.10
16 VOLTS DC WORKING; 20 VOLTS DC SURGE						
5600	82D562M016HA2D	22 x 25	96.0	71.0	2.12	2.46
10000	82D103M016HB2D	22 x 30	86.0	63.0	2.38	2.80
15000	82D153M016HD2D	22 x 40	57.7	42.0	3.25	3.83
8200	82D822M016JA2D	25 x 25	77.0	58.0	2.57	2.97
12000	82D123M016JB2D	25 x 30	71.0	53.0	2.85	3.29
15000	82D153M016JC2D	25 x 35	58.0	43.0	3.33	3.87

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size Millimeters D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-40k	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-40k
16 VOLTS DC WORKING; 20 VOLTS DC SURGE (Cont.)						
22000	82D223M016JD2D	25 x 40	44.8	33.0	4.15	4.85
27000	82D273M016JE2D	25 x 50	35.0	26.0	4.89	5.69
12000	82D123M016KA2D	30 x 25	67.7	54.0	3.07	3.47
22000	82D223M016KB2D	30 x 30	53.7	41.0	3.70	4.20
27000	82D273M016KC2D	30 x 35	43.8	33.0	4.27	4.98
33000	82D333M016KD2D	30 x 40	35.3	27.0	5.00	5.77
39000	82D393M016KE2D	30 x 50	28.0	21.8	6.12	6.89
27000	82D273M016MB2D	35 x 30	35.0	26.0	5.05	5.85
33000	82D333M016MC2D	35 x 35	28.0	21.0	5.96	6.87
47000	82D473M016MD2D	35 x 40	23.0	17.0	6.86	6.65
56000	82D563M016ME2D	35 x 50	17.5	13.3	8.51	9.78
82000	82D823M016MF2D	35 x 63	14.0	11.0	10.60	11.90
100000	82D104M016MG2D	35 x 80	11.2	9.0	12.70	14.10
25 VOLTS DC WORKING; 30 VOLTS DC SURGE						
3300	82D332M025HA2D	22 x 25	110.0	76.0	1.98	2.39
4700	82D472M025HB2D	22 x 30	85.0	58.0	2.40	2.91
8200	82D822M025HD2D	22 x 40	54.0	37.0	3.38	4.06
4700	82D472M025JA2D	25 x 25	86.0	60.0	2.43	2.93
6800	82D682M025JB2D	25 x 30	67.0	47.0	2.94	3.49
8200	82D822M025JC2D	25 x 35	54.0	38.0	3.47	4.09
10000	82D103M025JD2D	25 x 40	43.4	31.0	4.22	4.96
15000	82D153M025JE2D	25 x 50	33.9	24.0	4.97	5.96
6800	82D682M025KA2D	30 x 25	71.0	54.0	3.00	3.47
10000	82D103M025KB2D	30 x 30	54.0	41.0	3.70	4.20
12000	82D123M025KC2D	30 x 35	44.0	33.0	4.27	4.98
15000	82D153M025KD2D	30 x 40	36.4	27.0	5.00	5.77
22000	82D223M025KE2D	30 x 50	28.1	22.0	6.12	6.89
12000	82D123M025MB2D	35 x 30	35.0	25.0	5.05	5.97
18000	82D183M025MC2D	35 x 35	28.0	20.0	5.96	7.04
22000	82D223M025MD2D	35 x 40	23.0	17.0	6.84	7.96
27000	82D273M025ME2D	35 x 50	17.5	13.0	8.51	9.87
33000	82D333M025MF2D	35 x 63	14.0	10.0	10.60	12.50
47000	82D473M025MG2D	35 x 80	11.2	9.0	12.70	14.10
35 VOLTS DC WORKING; 40 VOLTS DC SURGE						
2200	82D222M035HA2D	22 x 25	121.0	76.0	1.88	2.39
3300	82D332M035HB2D	22 x 30	92.0	57.0	2.30	2.94
4700	82D472M035HD2D	22 x 40	59.0	37.0	3.21	4.06
3300	82D332M035JA2D	25 x 25	95.0	62.0	2.32	2.86
4700	82D472M035JB2D	25 x 30	72.0	47.0	2.82	3.49
5600	82D562M035JC2D	25 x 35	58.0	38.0	3.33	4.09
6800	82D682M035JD2D	25 x 40	46.6	30.0	4.08	5.08
10000	82D103M035JE2D	25 x 50	36.3	24.0	4.87	5.96
4700	82D472M035KA2D	30 x 25	75.0	54.0	2.92	3.42
6800	82D682M035KB2D	30 x 30	57.0	41.0	3.60	4.20
8200	82D822M035KC2D	30 x 35	46.6	33.0	4.20	4.98
12000	82D123M035KD2D	30 x 40	37.7	27.0	4.89	5.77
15000	82D153M035KE2D	30 x 50	30.5	22.0	5.96	6.89

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size Millimeters D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-40k	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-40k
35 VOLTS DC WORKING; 40 VOLTS DC SURGE (Cont)						
10000	82D103M035MB2D	35 x 30	36.0	24.0	4.97	6.10
12000	82D123M035MC2D	35 x 35	29.3	20.0	5.82	7.04
15000	82D153M035MD2D	35 x 40	25.0	16.3	6.57	8.13
18000	82D183M035ME2D	35 x 50	19.0	13.0	8.17	9.87
27000	82D273M035MF2D	35 x 63	15.0	10.0	10.20	12.50
33000	82D333M035MG2D	35 x 80	12.0	9.0	12.20	14.10
50 VOLTS DC WORKING; 63 VOLTS DC SURGE						
1200	82D122M050HA2D	22 x 25	148.0	79.0	1.71	2.32
1800	82D182M050HB2D	22 x 30	108.0	58.0	2.12	2.90
2700	82D272M050HD2D	22 x 40	70.0	38.0	2.96	3.98
1800	82D182M050JA2D	25 x 25	110.0	62.0	2.15	2.86
2200	82D222M050JB2D	25 x 30	85.0	48.0	2.61	3.49
2700	82D272M050JC2D	25 x 35	68.0	38.0	3.07	4.17
3900	82D392M050JD2D	25 x 40	53.6	31.0	3.79	4.96
5600	82D562M050JE2D	25 x 50	42.0	24.0	4.51	5.96
2700	82D272M050KA2D	30 x 25	85.0	54.0	2.73	3.42
3900	82D392M050KB2D	30 x 30	65.0	41.0	3.35	4.20
4700	82D472M050KC2D	30 x 35	53.0	33.0	3.89	4.98
5600	82D562M050KD2D	30 x 40	42.4	27.7	4.54	5.61
8200	82D822M050KE2D	30 x 50	33.0	22.0	5.69	6.89
4700	82D472M050MB2D	35 x 30	43.0	24.0	4.56	6.10
5600	82D562M050MC2D	35 x 35	34.0	20.0	5.40	7.04
6800	82D682M050MD2D	35 x 40	28.0	16.0	6.21	8.21
10000	82D103M050ME2D	35 x 50	22.0	13.0	7.60	9.87
12000	82D123M050MF2D	35 x 63	17.3	10.5	9.53	12.20
18000	82D183M050MG2D	35 x 80	14.0	9.0	11.40	14.10
63 VOLTS DC WORKING; 79 VOLTS DC SURGE						
1000	82D102M063HA2D	22 x 25	151.0	75.0	1.69	2.39
1500	82D152M063HB2D	22 x 30	118.0	59.0	2.03	2.87
2200	82D222M063HD2D	22 x 40	74.0	38.0	2.87	3.98
1500	82D152M063JA2D	25 x 25	121.0	63.0	2.05	2.86
1800	82D182M063JB2D	25 x 30	88.0	46.0	2.54	3.54
2200	82D222M063JC2D	25 x 35	72.0	38.0	2.97	4.09
3300	82D332M063JD2D	25 x 40	57.0	30.0	3.69	5.08
3900	82D392M063JE2D	25 x 50	44.0	24.0	4.35	5.96
2200	82D222M063KA2D	30 x 25	90.0	54.0	2.67	3.42
3300	82D332M063KB2D	30 x 30	68.0	41.0	3.28	4.20
3900	82D392M063KC2D	30 x 35	55.0	33.0	3.84	4.98
4700	82D472M063KD2D	30 x 40	44.0	27.0	4.47	5.77
6800	82D682M063KE2D	30 x 50	34.0	22.0	5.56	6.89
3900	82D392M063MB2D	35 x 30	45.0	24.0	4.42	6.10
4700	82D472M063MC2D	35 x 35	36.0	20.0	5.24	7.04
6800	82D682M063MD2D	35 x 40	29.0	16.0	6.10	8.21
8200	82D822M063ME2D	35 x 50	23.0	13.0	7.43	9.87
10000	82D103M063MF2D	35 x 63	18.4	10.4	9.26	12.30
15000	82D153M063MG2D	35 x 80	14.1	9.0	11.30	14.10

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size Millimeters D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-40k	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-40k
80 VOLTS DC WORKING; 100 VOLTS DC SURGE						
680	82D681M080HA2D	22 x 25	268.0	150.0	1.26	1.69
820	82D821M080HB2D	22 x 30	203.0	114.0	1.54	2.07
1500	82D152M080HD2D	22 x 40	131.0	74.0	2.15	2.87
1000	82D102M080JA2D	25 x 25	200.0	114.0	1.59	2.11
1200	82D122M080JB2D	25 x 30	160.0	91.0	1.90	2.52
1500	82D152M080JC2D	25 x 35	126.0	72.0	2.26	3.01
1800	82D182M080JD2D	25 x 40	99.0	57.0	2.77	3.69
2700	82D272M080JE2D	25 x 50	75.0	44.0	3.34	4.35
1500	82D152M080KA2D	30 x 25	147.0	87.0	2.08	2.71
1800	82D182M080KB2D	30 x 30	109.0	66.0	2.58	3.31
2200	82D222M080KC2D	30 x 35	86.0	52.0	3.07	3.95
3300	82D332M080KD2D	30 x 40	69.0	42.0	3.57	4.62
3900	82D392M080KE2D	30 x 50	54.0	33.0	4.44	5.69
2700	82D272M080MB2D	35 x 30	75.0	44.0	3.45	4.50
3300	82D332M080MC2D	35 x 35	61.0	35.0	4.00	5.30
3900	82D392M080MD2D	35 x 40	48.0	28.0	4.71	6.21
5600	82D562M080ME2D	35 x 50	37.0	22.0	5.86	7.58
6800	82D682M080MF2D	35 x 63	29.0	17.0	7.37	9.61
10000	82D103M080MG2D	35 x 80	23.0	13.5	8.90	11.50
100 VOLTS DC WORKING; 125 VOLTS DC SURGE						
390	82D391M100HA2D	22 x 25	343.0	151.0	1.12	1.69
470	82D471M100HB2D	22 x 30	258.0	114.0	1.37	2.07
820	82D821M100HD2D	22 x 40	161.0	72.0	1.94	2.90
560	82D561M100JA2D	25 x 25	253.0	115.0	1.41	2.10
680	82D681M100JB2D	25 x 30	188.0	86.0	1.75	2.59
820	82D821M100JC2D	25 x 35	150.0	69.0	2.06	3.04
1200	82D122M100JD2D	25 x 40	125.0	57.0	2.46	3.64
1500	82D152M100JE2D	25 x 50	90.0	42.0	3.05	4.51
820	82D821M100KA2D	30 x 25	178.0	86.0	1.89	2.73
1000	82D102M100KB2D	30 x 30	136.0	66.0	2.31	3.31
1500	82D152M100KC2D	30 x 35	106.0	52.0	2.75	3.95
1800	82D182M100KD2D	30 x 40	86.0	42.0	3.21	4.62
2200	82D222M100KE2D	30 x 50	66.0	33.0	4.02	5.69
1500	82D152M100MB2D	35 x 30	98.0	44.0	3.01	4.50
1800	82D182M100MC2D	35 x 35	79.0	36.0	3.53	5.19
2200	82D222M100MD2D	35 x 40	61.0	28.0	4.18	6.21
2700	82D272M100ME2D	35 x 50	46.0	22.0	4.76	7.58
3900	82D392M100MF2D	35 x 63	36.0	17.2	6.61	9.57
4700	82D472M100MG2D	35 x 80	28.0	13.5	8.07	11.50
160 VOLTS DC WORKING; 200 VOLTS DC SURGE						
180	82D181M160HA2D	22 x 25	741.0	392.0	0.809	1.11
220	82D221M160HB2D	22 x 30	551.0	291.0	1.00	1.37
390	82D391M160HD2D	22 x 40	344.0	184.0	1.41	1.93
220	82D221M160JA2D	25 x 25	548.0	296.0	1.02	1.39
330	82D331M160JB2D	25 x 30	411.0	221.0	1.26	1.71

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size Millimeters D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-40k	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-40k
160 VOLTS DC WORKING; 200 VOLTS DC SURGE (Cont.)						
390	82D391M160JC2D	25 x 35	326.0	176.0	1.49	2.03
470	82D471M160JD2D	25 x 40	256.0	139.0	1.83	2.49
680	82D681M160JE2D	25 x 50	194.0	107.0	2.21	2.96
390	82D391M160KA2D	30 x 25	374.0	211.0	1.39	1.85
470	82D471M160KB2D	30 x 30	278.0	157.0	1.72	2.28
680	82D681M160KC2D	30 x 35	222.0	128.0	2.02	2.67
820	82D821M160KD2D	30 x 40	175.0	99.0	2.39	3.17
1000	82D102M160KE2D	30 x 50	136.0	77.0	2.95	3.91
680	82D681M160MB2D	35 x 30	221.0	130.0	2.14	2.79
820	82D821M160MC2D	35 x 35	176.0	104.0	2.52	3.28
1200	82D122M160MD2D	35 x 40	139.0	83.0	2.96	3.84
1500	82D152M160ME2D	35 x 50	107.0	64.0	3.65	4.72
1800	82D182M160MF2D	35 x 63	82.0	50.0	4.64	5.99
2700	82D272M160MG2D	35 x 80	62.0	38.0	5.72	7.31
200 VOLTS DC WORKING; 250 VOLTS DC SURGE						
150	82D151M200HA2D	22 x 25	1012.0	361.0	0.697	1.17
220	82D221M200HB2D	22 x 30	594.0	255.0	0.967	1.48
330	82D331M200HD2D	22 x 40	381.0	165.0	1.35	2.06
220	82D221M200JA2D	25 x 25	625.0	272.0	0.967	1.46
270	82D271M200JB2D	25 x 30	525.0	191.0	1.12	1.85
390	82D391M200JC2D	25 x 35	341.0	151.0	1.47	2.22
470	82D471M200JD2D	25 x 40	271.0	121.0	1.79	2.68
560	82D561M200JE2D	25 x 50	205.0	91.0	2.17	3.25
330	82D331M200KA2D	30 x 25	498.0	192.0	1.21	1.96
470	82D471M200KB2D	30 x 30	294.0	136.0	1.64	2.48
560	82D561M200KC2D	30 x 35	279.0	107.0	1.82	2.95
680	82D681M200KD2D	30 x 40	221.0	87.0	2.14	3.41
1000	82D102M200KE2D	30 x 50	142.0	67.0	2.89	4.22
560	82D561M200MB2D	35 x 30	287.0	116.0	1.89	2.97
820	82D821M200MC2D	35 x 35	189.0	93.0	2.46	3.51
1000	82D102M200MD2D	35 x 40	149.0	74.0	2.88	3.41
1200	82D122M200ME2D	35 x 50	116.0	58.0	3.54	5.01
1800	82D182M200MF2D	35 x 63	89.0	45.0	4.51	6.35
2200	82D222M200MG2D	35 x 80	68.0	30.0	5.58	7.58
250 VOLTS DC WORKING; 300 VOLTS DC SURGE						
120	82D121M250HA2D	22 x 25	1077.0	385.0	68.00	1.17
180	82D181M250HB2D	22 x 30	722.0	261.0	88.00	1.52
220	82D221M250HD2D	22 x 40	558.0	166.0	1.12	2.12
180	82D181M250JA2D	25 x 25	753.0	275.0	0.89	1.51
220	82D221M250JB2D	25 x 30	513.0	189.0	1.13	1.94
270	82D271M250JC2D	25 x 35	494.0	151.0	1.21	2.31
330	82D331M250JD2D	25 x 40	382.0	121.0	1.51	2.79
470	82D471M250JE2D	25 x 50	243.0	93.0	1.99	3.35
270	82D271M250KA2D	30 x 25	500.0	194.0	1.21	2.02
330	82D331M250KB2D	30 x 30	398.0	135.0	1.44	2.58
390	82D391M250KC2D	30 x 35	328.0	109.0	1.68	3.03

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size Millimeters D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-40k	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-40k
250 VOLTS DC WORKING; 300 VOLTS DC SURGE (Cont.)						
560	82D561M250KD2D	30 x 40	283.0	87.0	2.16	3.54
680	82D681M250KE2D	30 x 50	198.0	67.0	2.46	4.41
470	82D471M250MB2D	35 x 30	281.0	117.0	1.92	3.07
560	82D561M250MC2D	35 x 35	270.0	94.0	2.06	3.62
680	82D681M250MD2D	35 x 40	209.0	74.0	2.43	4.26
1000	82D102M250ME2D	35 x 50	132.0	58.0	3.32	5.21
1200	82D122M250MF2D	35 x 63	108.0	40.0	4.09	6.49
1500	82D152M250MG2D	35 x 80	93.0	35.0	4.73	8.01
300 VOLTS DC WORKING; 350 VOLTS DC SURGE						
68	82D680M300HA2D	22 x 25	3100.0	1800.0	0.39	0.52
100	82D101M300HB2D	22 x 30	2090.0	1210.0	0.51	0.68
120	82D121M300HD2D	22 x 40	1340.0	780.0	0.72	0.94
100	82D101M300JA2D	25 x 25	2180.0	1270.0	0.52	0.67
150	82D151M300JB2D	25 x 30	1490.0	870.0	0.66	1.13
180	82D181M300JC2D	25 x 35	1160.0	680.0	0.97	1.26
220	82D221M300JD2D	25 x 40	900.0	520.0	1.20	1.58
270	82D271M300JE2D	25 x 50	670.0	390.0	1.46	1.91
150	82D151M300KA2D	30 x 25	1530.0	900.0	0.69	0.90
220	82D221M300KB2D	30 x 30	970.0	570.0	0.92	1.20
270	82D271M300KC2D	30 x 35	780.0	460.0	1.08	1.41
330	82D331M300KD2D	30 x 40	600.0	350.0	1.29	1.69
470	82D471M300KE2D	30 x 50	440.0	260.0	1.64	2.14
270	82D271M300MB2D	35 x 30	750.0	450.0	1.16	1.50
330	82D331M300MC2D	35 x 35	590.0	350.0	1.38	1.80
470	82D471M300MD2D	35 x 40	450.0	270.0	1.65	2.13
560	82D561M300ME2D	35 x 50	340.0	200.0	2.06	2.68
820	82D821M300MF2D	35 x 63	250.0	150.0	2.67	3.45
1000	82D102M300MG2D	35 x 80	190.0	110.0	3.29	4.33
350 VOLTS DC WORKING; 400 VOLTS DC SURGE						
56	82D560M350HA2D	22 x 25	3360.0	1800.0	0.38	0.52
82	82D820M300HB2D	22 x 30	2270.0	1220.0	0.49	0.67
120	82D121M350HD2D	22 x 40	1390.0	740.0	0.71	0.96
82	82D820M350JA2D	25 x 25	2370.0	1280.0	0.49	0.67
120	82D121M350JB2D	25 x 30	1620.0	880.0	0.63	0.86
150	82D151M350JC2D	25 x 35	1270.0	690.0	0.76	1.03
180	82D181M350JD2D	25 x 40	990.0	540.0	0.93	1.27
220	82D221M350JE2D	25 x 50	727.0	395.0	1.14	1.55
120	82D121M350KA2D	30 x 25	1550.0	840.0	0.68	0.93
180	82D181M350KB2D	30 x 30	1100.0	600.0	0.87	1.17
220	82D221M350KC2D	30 x 35	838.0	450.0	1.04	1.42
270	82D271M350KD2D	30 x 40	645.0	350.0	1.25	1.69
330	82D331M350KE2D	30 x 50	480.0	265.0	1.57	2.12
220	82D221M350MB2D	35 x 30	850.0	470.0	1.09	1.47
270	82D271M350MC2D	35 x 35	660.0	360.0	1.31	1.77
330	82D331M350MD2D	35 x 40	485.0	270.0	1.59	2.13
470	82D471M350ME2D	35 x 50	360.0	200.0	2.00	2.68
680	82D681M350MF2D	35 x 63	270.0	150.0	2.57	3.45
820	82D821M350MG2D	35 x 80	202.0	115.0	3.20	4.23

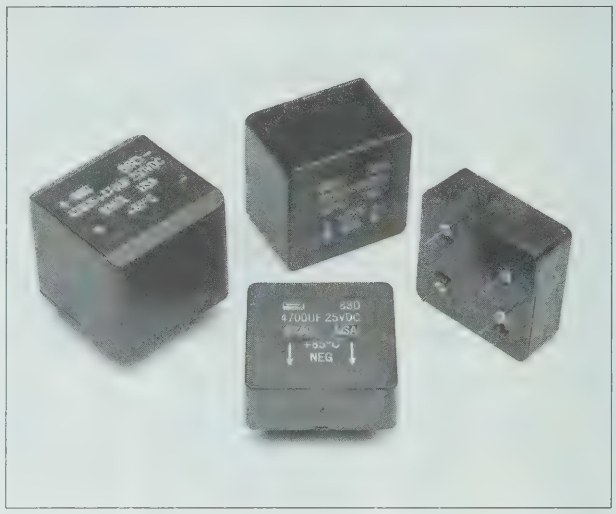
STANDARD RATINGS

μF	Catalog Number	Nominal Case Size Millimeters D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-40k	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-40k
385 VOLTS DC WORKING; 415 VOLTS DC SURGE						
47	82D470M385HA2D	22 x 25	3450.0	1800.0	0.38	0.52
68	82D680M385HB2D	22 x 30	2320.0	1210.0	0.49	0.67
120	82D121M385HD2D	22 x 40	1400.0	730.0	0.70	0.97
68	82D680M385JA2D	25 x 25	2430.0	1280.0	0.49	0.67
100	82D101M385JB2D	25 x 30	1650.0	870.0	0.63	0.86
120	82D121M385JC2D	25 x 35	1340.0	700.0	0.74	1.02
180	82D181M385JD2D	25 x 40	1020.0	540.0	0.92	1.26
220	82D221M385JE2D	25 x 50	780.0	410.0	1.10	1.52
120	82D121M385KA2D	30 x 25	1580.0	830.0	0.68	0.94
150	82D151M385KB2D	30 x 30	1130.0	600.0	0.85	1.17
220	82D221M385KC2D	30 x 35	852.0	450.0	1.04	1.42
270	82D271M385KD2D	30 x 40	670.0	360.0	1.22	1.67
330	82D331M385KE2D	30 x 50	500.0	265.0	1.54	2.12
220	82D221M385MB2D	35 x 30	880.0	460.0	1.07	1.48
270	82D271M385MC2D	35 x 35	660.0	350.0	1.31	1.79
330	82D331M385MD2D	35 x 40	510.0	270.0	1.55	2.13
470	82D471M385ME2D	35 x 50	380.0	200.0	1.95	2.68
560	82D561M385MF2D	35 x 63	288.0	150.0	2.49	3.45
820	82D821M385MG2D	35 x 80	210.0	110.0	3.13	4.33
400 VOLTS DC WORKING; 450 VOLTS DC SURGE						
47	82D470M400HA2D	22 x 25	4310.0	2450.0	0.34	0.45
68	82D680M400HB2D	22 x 30	2890.0	1640.0	0.44	0.58
100	82D101M400HD2D	22 x 40	1740.0	990.0	0.63	0.83
68	82D680M400JA2D	25 x 25	3020.0	1720.0	0.44	0.58
100	82D101M400JB2D	25 x 30	2060.0	1176.0	0.56	0.74
120	82D121M400JC2D	25 x 35	1600.0	910.0	0.67	0.89
150	82D151M400JD2D	25 x 40	1280.0	730.0	0.82	1.09
220	82D221M400JE2D	25 x 50	960.0	540.0	0.99	1.33
100	82D101M400KA2D	30 x 25	1980.0	1120.0	0.61	0.81
150	82D151M400KB2D	30 x 30	1430.0	820.0	0.76	1.00
180	82D181M400KC2D	30 x 35	1040.0	600.0	0.94	1.23
220	82D221M400KD2D	30 x 40	820.0	470.0	1.10	1.46
330	82D331M400KE2D	30 x 50	620.0	350.0	1.38	1.84
180	82D181M400MB2D	35 x 30	1070.0	610.0	0.97	1.29
270	82D271M400MC2D	35 x 35	840.0	480.0	1.16	1.53
330	82D331M400MD2D	35 x 40	630.0	360.0	1.39	1.85
390	82D391M400ME2D	35 x 50	480.0	270.0	1.73	2.31
560	82D561M400MF2D	35 x 63	350.0	200.0	2.26	2.99
820	82D821M400MG2D	35 x 80	260.0	150.0	2.82	3.71
450 VOLTS DC WORKING; 500 VOLTS DC SURGE						
39	82D390M450HA2D	22 x 25	4690.0	2460.0	0.32	0.45
56	82D560M450HB2D	22 x 30	3120.0	1640.0	0.42	0.58
100	82D101M450HD2D	22 x 40	1880.0	990.0	0.61	0.83
56	82D560M450JA2D	25 x 25	3280.0	1730.0	0.42	0.58
82	82D820M450JB2D	25 x 30	2230.0	1170.0	0.54	0.75
100	82D101M450JC2D	25 x 35	1730.0	915.0	0.65	0.89

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size Millimeters D x L	Max. ESR @ +25°C (mΩ) 120Hz	Max. ESR @ +25°C (mΩ) 20k-40k	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-40k
450 VOLTS DC WORKING; 500 VOLTS DC SURGE (Cont.)						
120	82D121M450JD2D	25 x 40	1360.0	720.0	0.80	1.09
180	82D181M450JE2D	25 x 50	1040.0	550.0	0.96	1.31
82	82D820M450KA2D	30 x 25	2120.0	1120.0	0.59	0.81
120	82D121M450KB2D	30 x 30	1470.0	780.0	0.75	1.03
150	82D151M450KC2D	30 x 35	1150.0	610.0	0.89	1.22
180	82D181M450KD2D	30 x 40	910.0	480.0	1.05	1.44
270	82D271M450KE2D	30 x 50	680.0	360.0	1.32	1.82
150	82D151M450MB2D	35 x 30	1170.0	620.0	0.93	1.28
220	82D221M450MC2D	35 x 35	870.0	460.0	1.14	1.56
270	82D271M450MD2D	35 x 40	690.0	370.0	1.33	1.82
330	82D331M450ME2D	35 x 50	510.0	274.0	1.68	2.29
470	82D471M450MF2D	35 x 63	380.0	205.0	2.17	2.95
680	82D681M450MG2D	35 x 80	280.0	150.0	2.71	3.71

+85°C Plastic Case Plug-In Design Aluminum Capacitors



L65-13

Features —

- **Low Profile Plastic Case SMPS Output Capacitor**
- **Lowest ESR Available**
- **4 Terminal Design for Minimum ESL**
- **Polarity Proof**
- **Dual Pack Design Available for SMPS Input Filters**

General Specifications —

Operating Temperature: −40°C to +85°C.

Voltage Range: 3 - 450 VDC.

Capacitance Range: 56μF - 47,000μF.

Capacitance Tolerance: ±20%.

Case Size Range: 1.625″ x 1.625″ x 0.690″ - 1.625″ x 1.625″ x 1.576″.

Termination: 4 radial leads.

Life Validation Test: 2000 hrs @ +85°C:
- Δ CAP ≤ 20% from initial measurement.
- Δ ESR ≤ 1.5x initial specified limit.
- Δ DCL ≤ initial specified limit.

Shelf Test: 500 hrs @ +85°C:
- Δ CAP ≤ 15% from initial measurement.
- Δ ESR ≤ 1.3x initial specified limit.
- Δ DCL ≤ 2x initial specified limit.

DC Leakage Current: after 5 min. charge.
$I = K\sqrt{CV}$
K = 4.0 @ +25°C
I in μa, C in μF, V in Volts

Ripple Current Multipliers:

	TEMPERATURE			
Ambient Temp.	+55°C	+65°C	+75°C	+85°C
Multipliers	2.0	1.7	1.4	1.0

Typical Weight

Case Size	Wt. Grams
BA	39
BB	66
CC	88

Performance Characteristics —

SEE PAGE 2.

Catalog Numbering System

88D 153 M 6R3 B A

CASE HEIGHT. A = 0.690″ (17.5 mm)
B = 1.181″ (30 mm)
C = 1.576″ (40 mm)

CONFIGURATION. B = SINGLE SECTION CAPACITOR.
C = DUAL SECTION CAPACITOR.

DC VOLTAGE RATING. EXPRESSED IN VOLTS. 'R' IS USED TO INDICATE A DECIMAL POINT. FOR EXAMPLE: 6R3 = 6.3 VOLTS.

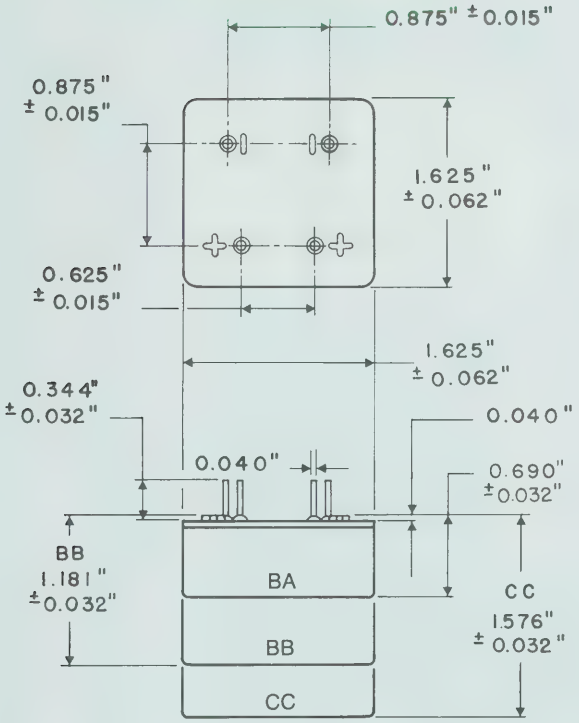
CAPACITANCE TOLERANCE. M = ±20% (Standard).

CAPACITANCE. EXPRESSED IN MICROFARADS. THE FIRST TWO DIGITS ARE SIGNIFICANT FIGURES, THE THIRD IS THE NUMBER OF ZEROS. FOR DUAL SECTION UNITS THE CAPACITANCE RATING IS THE SAME FOR EACH SECTION.

TYPE NUMBER. IDENTIFIES THE BASIC CAPACITOR DESIGN.

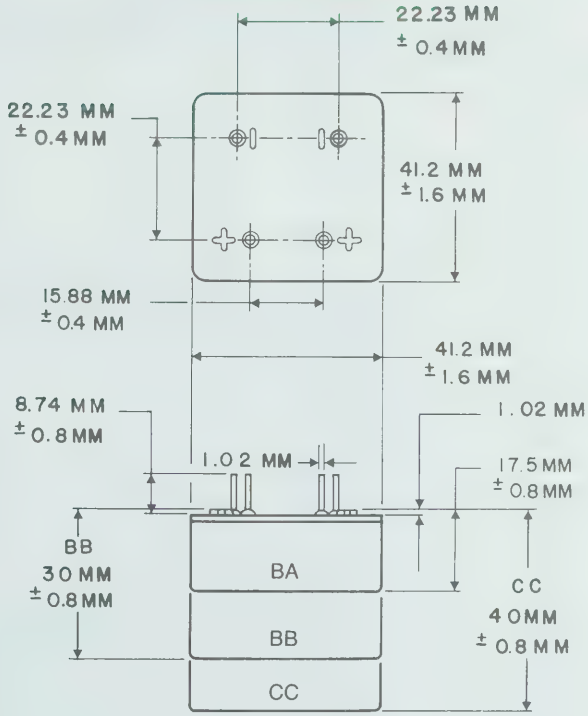
DIMENSIONS

TYPE 88D (INCHES)



Dwg. No. A-14,847

TYPE 88D (MILLIMETERS)



Dwg. No. A-14,848

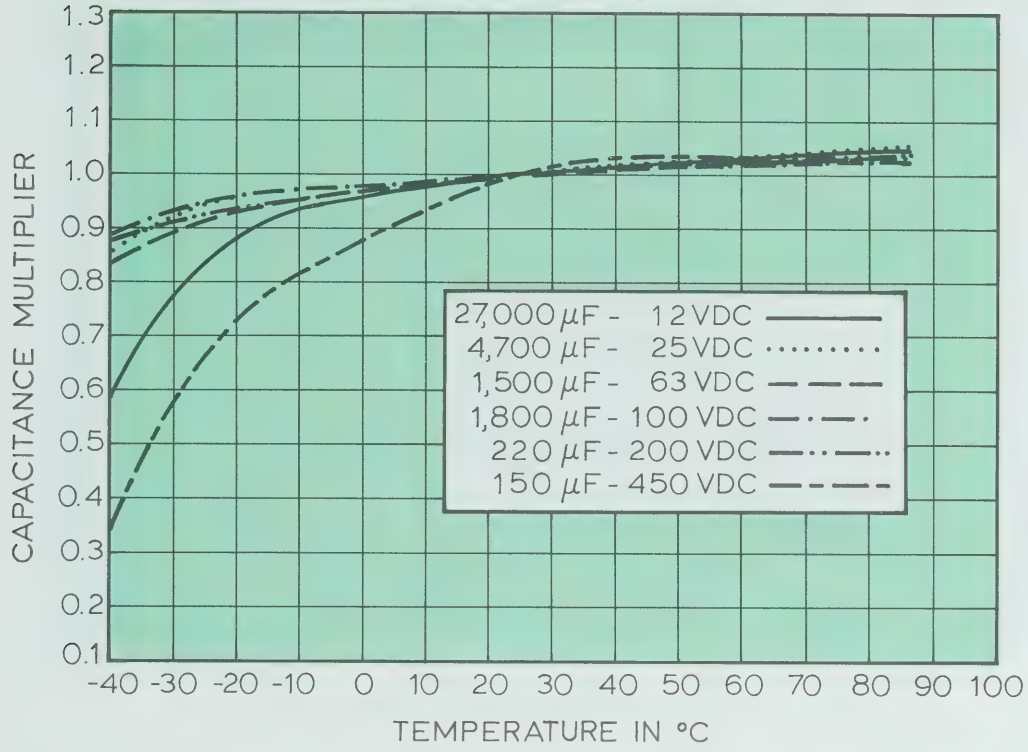
Dwg. No. A-14,849

STANDARD RATINGS

WVDC	VDC Surge	μF	Catalog Number	ESR Ohms @ +25°C 120Hz Max.	ESR Ohms @ +25°C 20k-500kHz ±30%	Max. Ripple Current Amperes @ +85°C 120Hz	Max. Ripple Current Amperes @ +85°C 20k-500kHz	Max. Impedance Ohms @ 100kHz, +25°C
SINGLE SECTION — BA CASE								
3	4	18000	88D183M003BA	0.0280	0.0133	5.25	5.68	0.0188
6.3	8	15000	88D153M6R3BA	0.0213	0.0133	5.11	5.68	0.0188
7.5	9	12000	88D123M7R5BA	0.0224	0.0133	4.99	5.68	0.0188
12	16	10000	88D103M012BA	0.0237	0.0133	4.86	5.68	0.0188
16	18	8200	88D822M016BA	0.0251	0.0133	4.72	5.68	0.0188
20	25	6800	88D682M020BA	0.0257	0.0137	4.66	5.60	0.0176
25	35	4700	88D472M025BA	0.0265	0.0140	4.59	5.53	0.0179
30	40	3900	88D392M030BA	0.0288	0.0140	4.40	5.53	0.0179
35	45	3300	88D332M035BA	0.0314	0.0140	4.22	5.53	0.0179
40	50	2700	88D272M040BA	0.0349	0.0140	4.00	5.53	0.0179
50	65	2200	88D222M050BA	0.0414	0.0156	3.67	5.25	0.0200
63	75	1500	88D152M063BA	0.0526	0.0156	3.26	5.25	0.0200
75	95	1200	88D122M075BA	0.0725	0.0256	2.78	4.10	0.0343
100	125	680	88D681M100BA	0.1046	0.0263	2.31	4.04	0.0347
160	200	270	88D271M160BA	0.3599	0.0803	1.30	2.74	0.1084
200	250	220	88D221M200BA	0.4559	0.0807	1.15	2.73	0.1089
250	300	150	88D151M250BA	0.5788	0.0813	1.02	2.72	0.1098
360	400	82	88D820M360BA	1.5370	0.4906	0.62	1.11	0.6623
400	475	68	88D680M400BA	2.1450	0.7151	0.56	1.09	0.9654
450	525	56	88D560M450BA	2.4057	0.7515	0.53	1.06	1.0146
SINGLE SECTION — BB CASE								
3	4	47000	88D473M003BB	0.0119	0.0092	7.92	8.20	0.0119
6.3	8	39000	88D393M6R3BB	0.0123	0.0092	7.78	8.20	0.0119
7.5	9	33000	88D333M7R5BB	0.0131	0.0092	7.54	8.20	0.0119
12	16	27000	88D273M012BB	0.0132	0.0092	7.51	8.20	0.0119
16	18	18000	88D183M016BB	0.0143	0.0092	7.22	8.20	0.0119
20	25	15000	88D153M020BB	0.0140	0.0095	7.30	7.78	0.0121
25	35	12000	88D123M025BB	0.0149	0.0095	7.08	7.78	0.0121
30	40	10000	88D103M030BB	0.0157	0.0095	6.88	7.78	0.0121
35	45	8200	88D822M035BB	0.0168	0.0095	6.65	7.78	0.0121
40	50	6800	88D682M040BB	0.0183	0.0095	6.39	7.78	0.0121
50	65	5600	88D562M050BB	0.0207	0.0100	6.00	7.59	0.0128
63	75	3900	88D392M063BB	0.0248	0.0100	5.49	7.59	0.0128
75	95	3300	88D332M075BB	0.0312	0.0142	4.88	6.36	0.0181
100	125	1800	88D182M100BB	0.0419	0.0142	4.22	6.36	0.0181
160	200	680	88D681M160BB	0.1481	0.0378	2.34	3.77	0.0486
200	250	560	88D561M200BB	0.1657	0.0380	2.20	3.72	0.0487
250	300	470	88D471M250BB	0.1783	0.0381	2.13	3.72	0.0490
360	400	220	88D221M360BB	0.5088	0.1250	1.26	2.07	0.1688
400	475	180	88D181M400BB	0.8067	0.2874	1.05	1.62	0.3875
450	525	150	88D151M450BB	0.8949	0.3158	0.99	1.55	0.4253
DUAL SECTION — CC CASE								
200	250	470 + 470	88D471M200CC	0.2214	0.0562	1.48	2.40	0.0759
200	250	560 + 560	88D561M200CC	0.1966	0.0560	1.58	2.42	0.0756
200	250	680 + 680	88D681M200CC	0.1760	0.0570	1.66	2.38	0.0760
250	300	330 + 330	88D331M250CC	0.2875	0.0593	1.30	2.34	0.0801
250	300	390 + 390	88D391M250CC	0.2537	0.0584	1.39	2.37	0.0788
250	300	470 + 470	88D471M250CC	0.2254	0.0588	1.47	2.34	0.0780

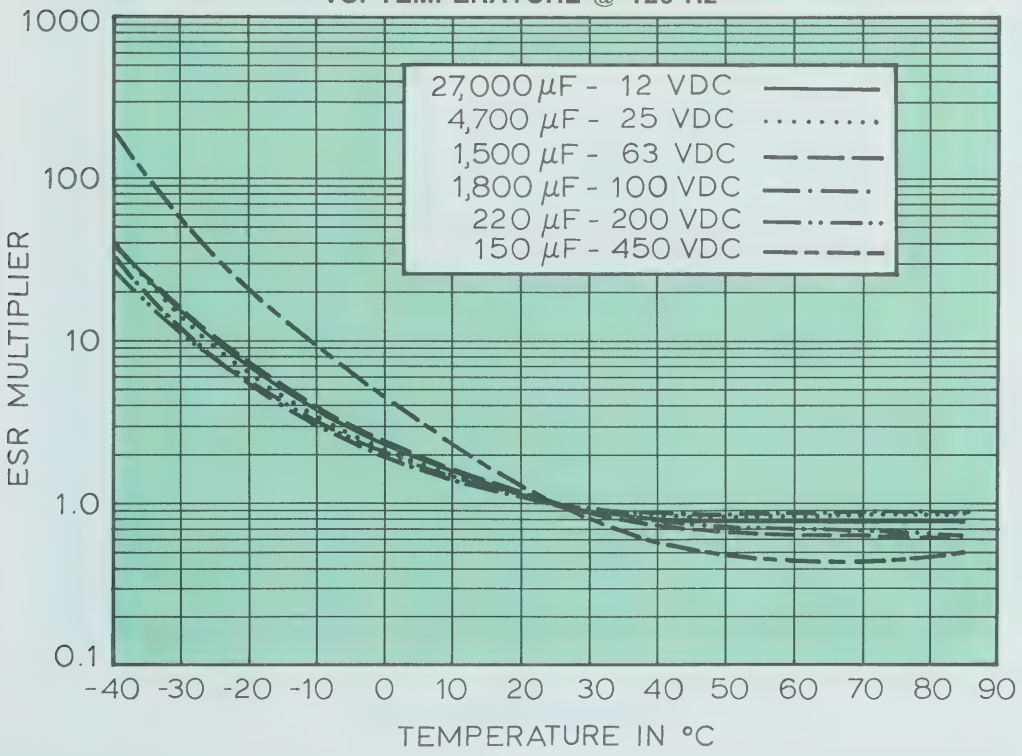
TYPICAL CURVES

TYPE 88D — TYPICAL CAPACITANCE MULTIPLIER
VS. TEMPERATURE @ 120 Hz



Dwg. No. A-14,727

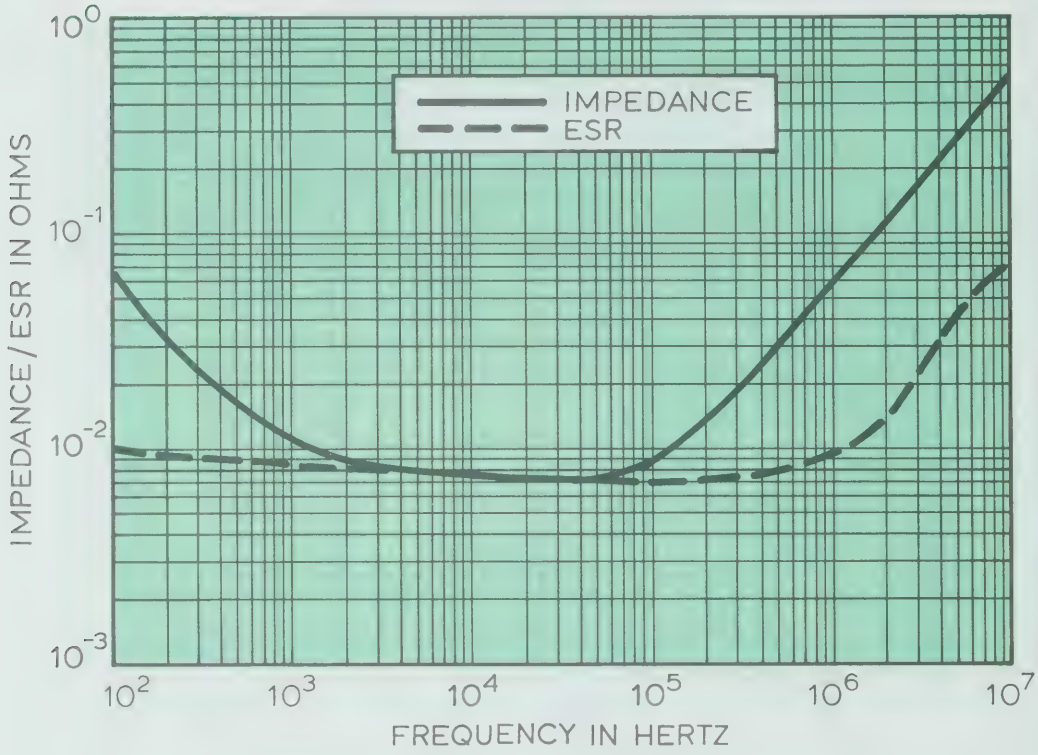
TYPE 88D — TYPICAL ESR MULTIPLIER
VS. TEMPERATURE @ 120 Hz



Dwg. No. A-14,720

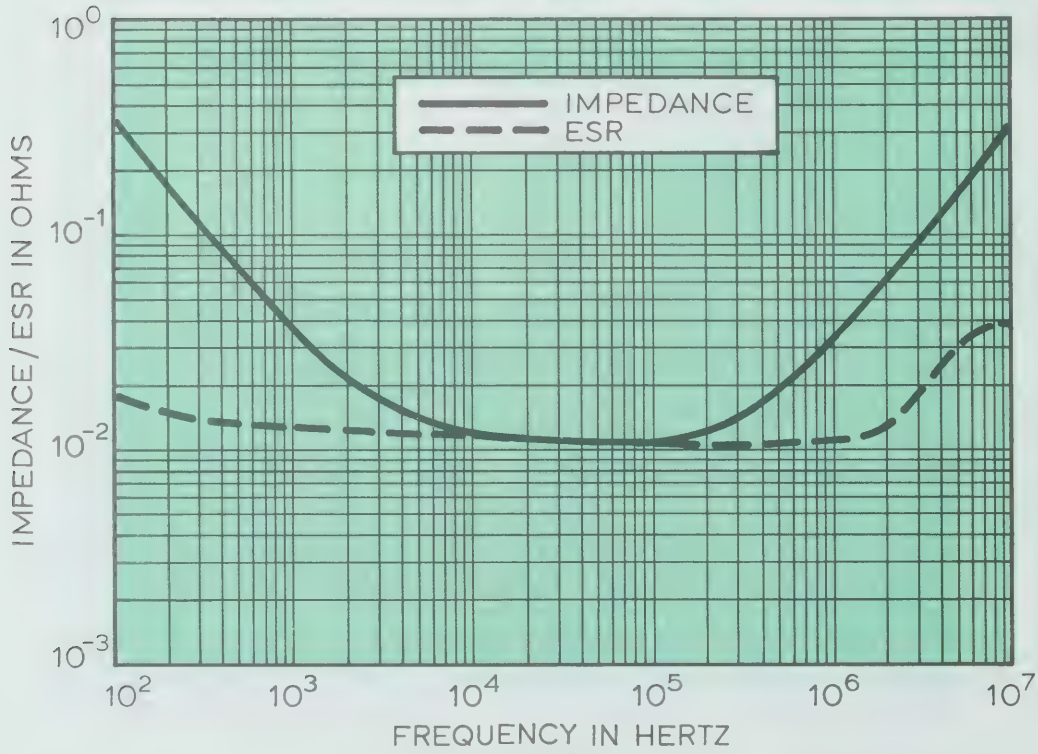
TYPICAL CURVES @ +25°C

TYPE 88D — 27000μF @ 12VDC, BB CASE SIZE



Dwg. No. A-14,675

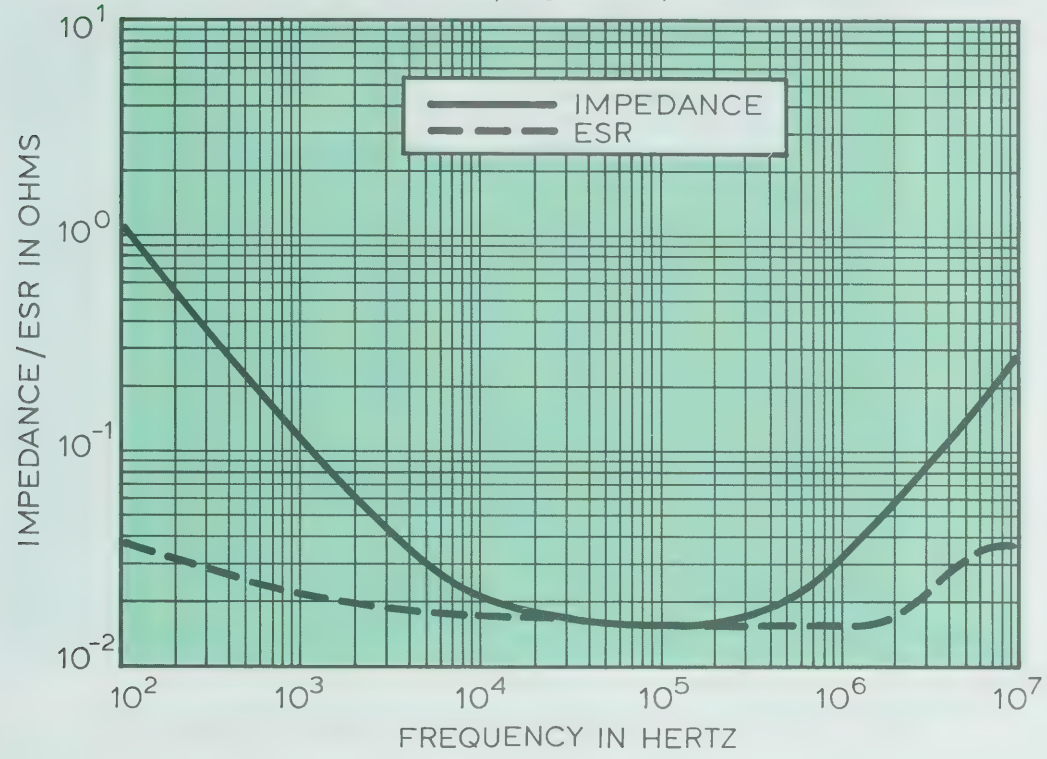
TYPE 88D — 4700μF @ 25VDC, BA CASE SIZE



Dwg. No. A-14,674

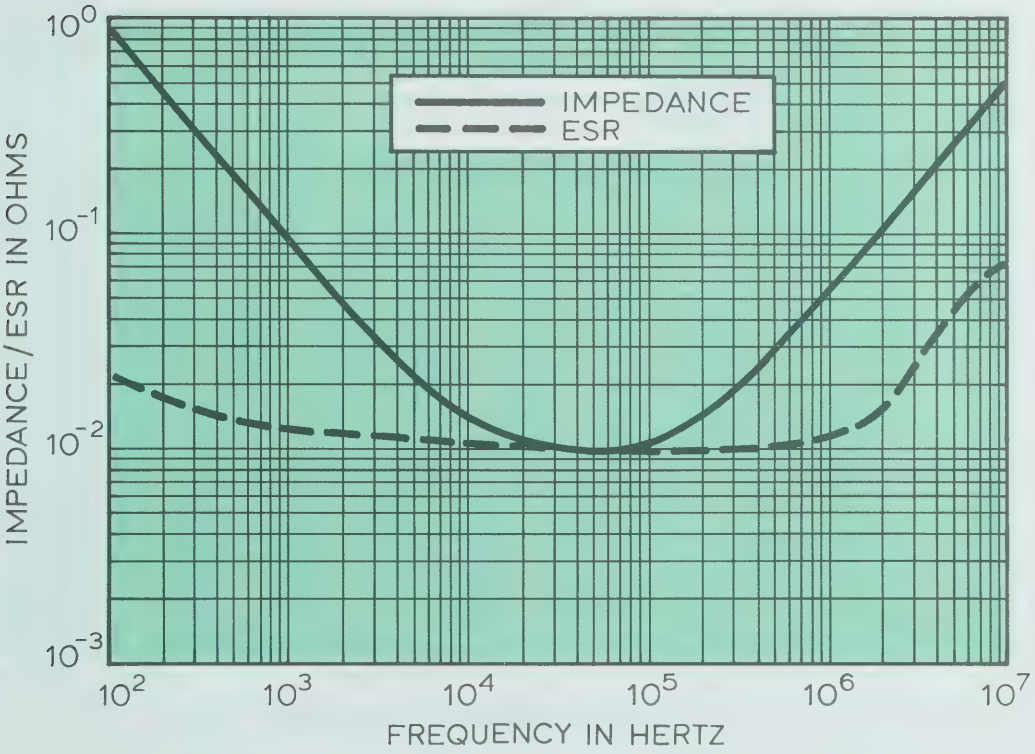
TYPICAL CURVES @ +25°C

TYPE 88D — 1500μF @ 63VDC, BA CASE SIZE



Dwg. No. A-14,673

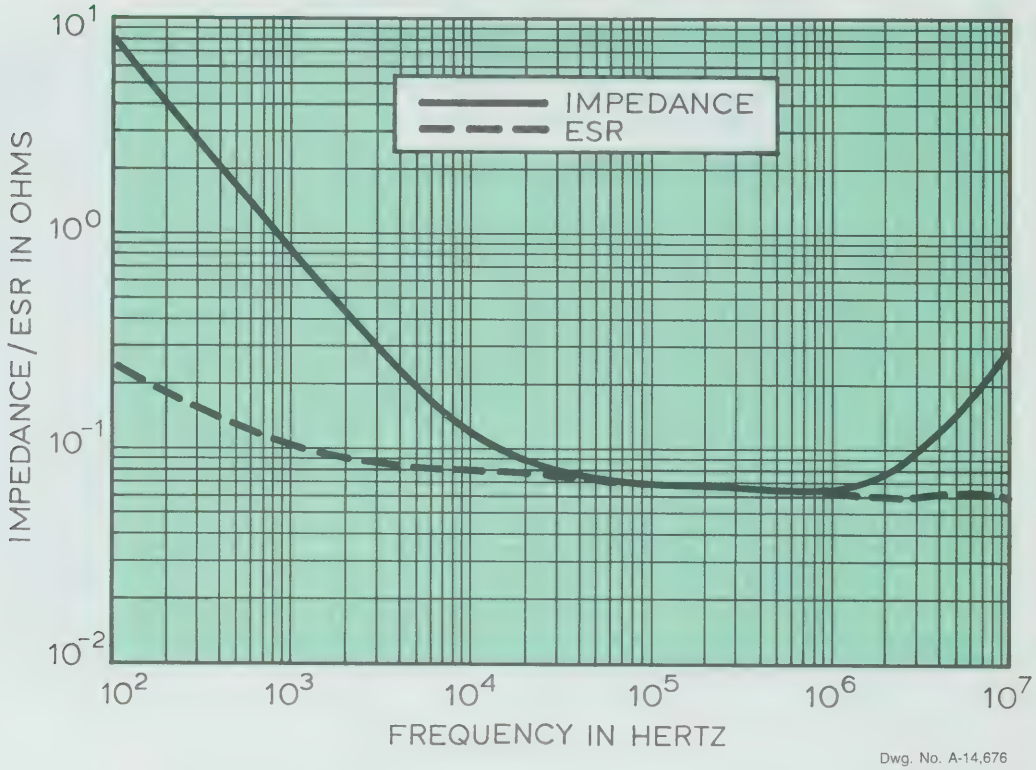
TYPE 88D — 1800μF @ 100VDC, BB CASE SIZE



Dwg. No. A-14,672

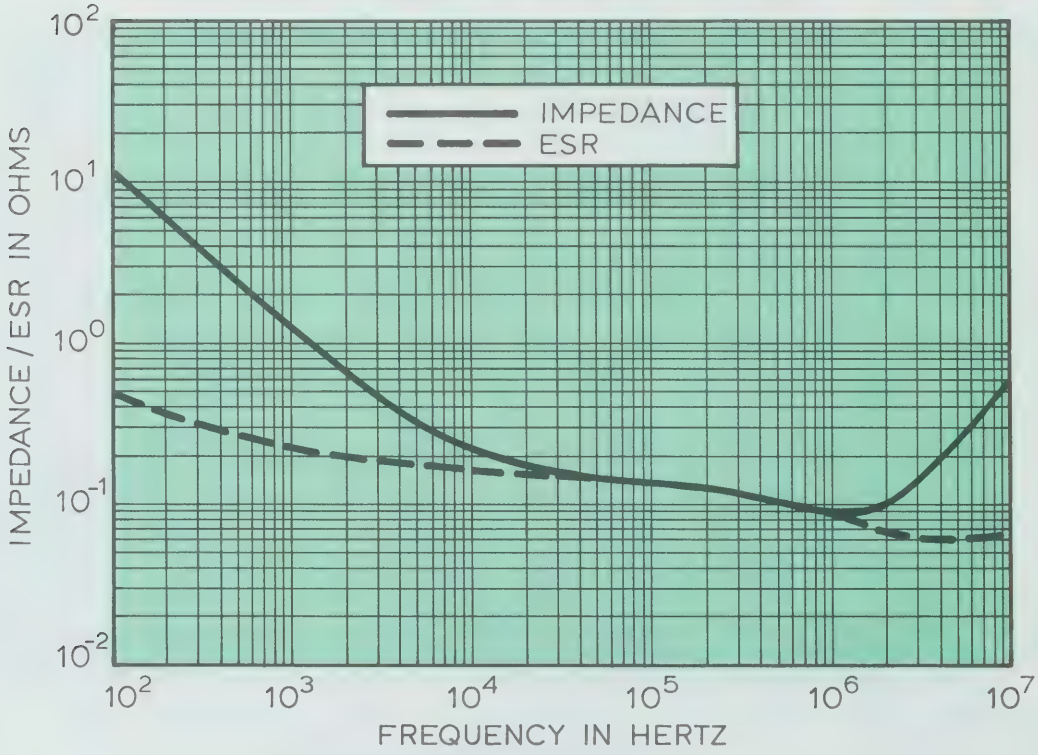
TYPICAL CURVES @ +25°C

TYPE 88D — 220μF @ 200VDC, BA CASE SIZE



Dwg. No. A-14,676

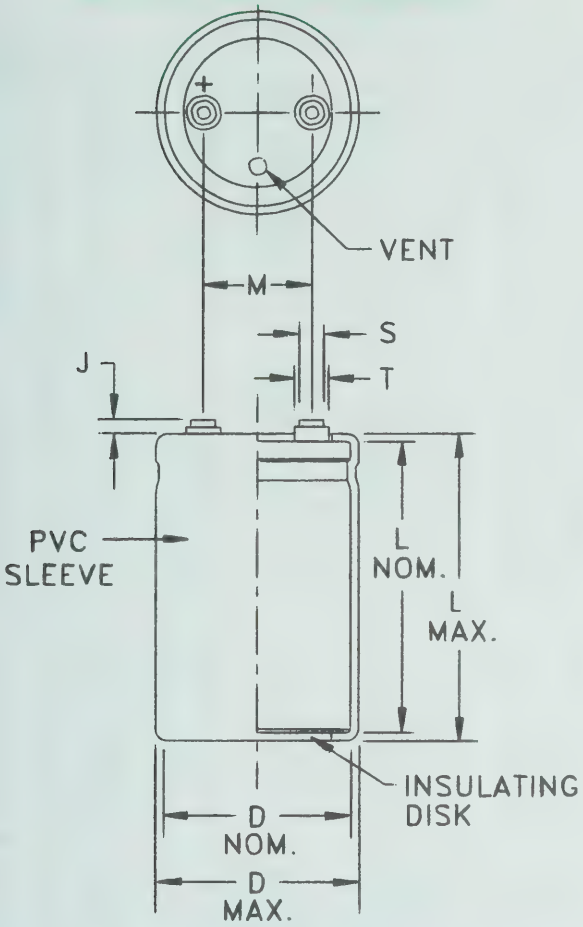
TYPE 88D — 150μF @ 450VDC, BB CASE SIZE



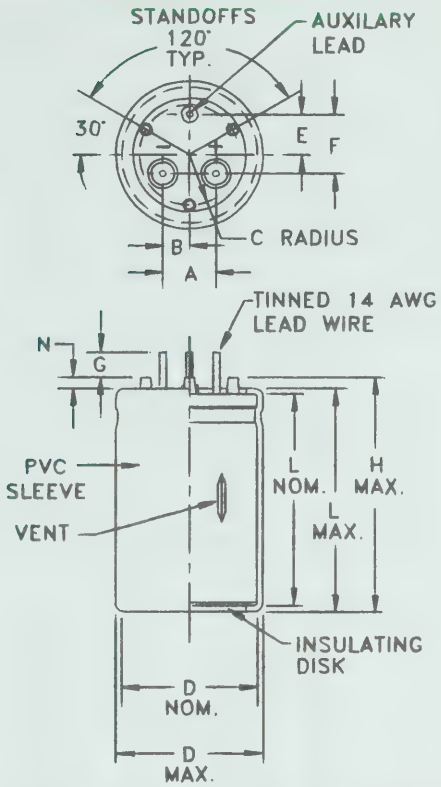
Dwg. No. A-14,677

OUTLINE DRAWING

SCREW—INSERT TERMINALS



VERTICAL MOUNT TERMINAL CODE "P"



CIRCUIT BOARD VERTICAL MOUNT AVAILABLE ON "A", "E", AND "B" DIAMETER CODES ONLY (≤2.0 inch – 51 mm–dia.)

SCREW INSERT TERMINAL DIMENSIONS

Terminal Code	Thread	Inches				Millimeters				Notes
		Thread Depth	Height J ± 0.032	Diameter S ± 0.010	Diameter T ± 0.010	Thread Depth	Height J ± 0.8	Diameter S ± 0.25	Diameter T ± 0.25	
A	10-32 NF-28	0.219	0.063	0.313	0.438	5.6	1.6	8.0	11.1	All sizes
B	10-32 NF-28	0.375	0.250	0.313	0.438	9.5	6.4	8.0	11.1	All sizes
D	1/4-28 NF-28	0.344	0.093	0.688	---	8.7	2.4	17.5	---	C & D Dia. Codes Only
I	M5	0.375	0.250	0.313	---	9.5	6.4	8.0	---	602D, 622D, Series Only
N	M5	0.219	0.063	0.313	0.438	5.6	1.6	8.0	11.1	36D Series Only
T	M5	0.375	0.250	0.313	0.438	9.5	6.4	8.0	11.1	36D Series Only

CIRCUIT BOARD MOUNT "P" TERMINAL DIMENSIONS

Inches Nominal Case Diameter	A ± 0.032	B ± 0.032	C* ± 0.032	E ± 0.032	F ± 0.032	G* ± 0.020	N Min.
1.375	0.500	0.250	0.469	0.375	0.550	0.312	0.050
2.000	0.800	0.400	0.750	0.575	1.000	0.312	0.050

Millimeters Nominal Case Diameter	A ± 0.8	B ± 0.8	C* ± 0.8	E ± 0.8	F ± 0.8	G* ± 0.5	N Min.
35	12.7	6.4	11.9	9.5	14.0	7.9	1.3
51	20.3	10.2	19.1	14.6	25.4	7.9	1.3

DIMENSIONS FOR LARGE CAN CAPACITORS

DIMENSIONS IN INCHES

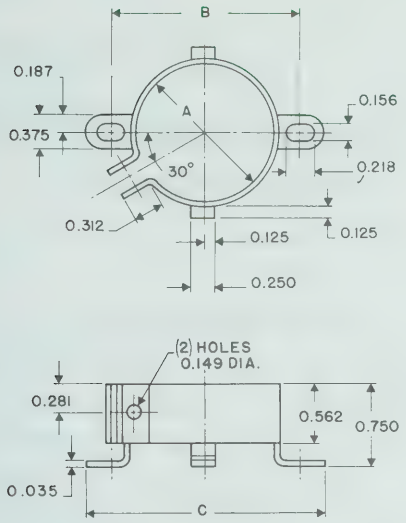
Case Code	Nominal D ± 0.032″	Nominal L ± 0.063″	With Insulating Sleeve D Max.	With Insulating Sleeve L Max.	With Insulating Sleeve (P Term) H Max.	Terminal Spacing M ± 0.016″
AN	1.375	1.625	1.453	1.750	1.849	0.500
AY	1.375	1.875	1.453	2.000	2.099	0.500
AA	1.375	2.125	1.453	2.250	2.349	0.500
AM	1.375	2.625	1.453	2.750	2.849	0.500
AB	1.375	3.125	1.453	3.250	3.349	0.500
AL	1.375	3.625	1.453	3.750	3.849	0.500
AC	1.375	4.125	1.453	4.250	4.349	0.500
AD	1.375	4.625	1.453	4.750	4.849	0.500
AE	1.375	5.125	1.453	5.250	5.349	0.500
AF	1.375	5.625	1.453	5.750	5.849	0.500
EN	1.750	1.625	1.828	1.750	1.849	0.750
EY	1.750	1.875	1.828	2.000	2.099	0.750
EA	1.750	2.125	1.828	2.250	2.349	0.750
EM	1.750	2.625	1.828	2.750	2.849	0.750
EB	1.750	3.125	1.828	3.250	3.349	0.750
EL	1.750	3.625	1.828	3.750	3.849	0.750
EC	1.750	4.125	1.828	4.250	4.349	0.750
ED	1.750	4.625	1.828	4.750	4.849	0.750
EE	1.750	5.125	1.828	5.250	5.349	0.750
EF	1.750	5.625	1.828	5.750	5.849	0.750
BY	2.000	1.875	2.078	2.000	2.099	0.875
BA	2.000	2.125	2.078	2.250	2.349	0.875
BM	2.000	2.625	2.078	2.750	2.849	0.875
BB	2.000	3.125	2.078	3.250	3.349	0.875
BL	2.000	3.625	2.078	3.750	3.849	0.875
BC	2.000	4.125	2.078	4.250	4.349	0.875
BD	2.000	4.625	2.078	4.750	4.849	0.875
BE	2.000	5.125	2.078	5.250	5.349	0.875
BF	2.000	5.625	2.078	5.750	5.849	0.875
CB	2.500	3.125	2.578	3.250	N/A	1.125
CL	2.500	3.625	2.578	3.750	N/A	1.125
CC	2.500	4.125	2.578	4.250	N/A	1.125
CD	2.500	4.625	2.578	4.750	N/A	1.125
CE	2.500	5.125	2.578	5.250	N/A	1.125
CF	2.500	5.625	2.578	5.750	N/A	1.125
DB	3.000	3.125	3.078	3.250	N/A	1.250
DL	3.000	3.625	3.078	3.750	N/A	1.250
DC	3.000	4.125	3.078	4.250	N/A	1.250
DD	3.000	4.625	3.078	4.750	N/A	1.250
DE	3.000	5.125	3.078	5.250	N/A	1.250
DF	3.000	5.625	3.078	5.750	N/A	1.250
DJ	3.000	8.625	3.078	8.750	N/A	1.250

DIMENSIONS IN MILLIMETERS

Case Code	Nominal D ± .82mm	Nominal L ± 1.6mm	With Insulating Sleeve D Max.	With Insulating Sleeve L Max.	With Insulating Sleeve (P Term) H Max.	Terminal Spacing M ± 0.4mm	Typical Weight (Grams)
AN	35	41	36.9	44.5	47.0	12.7	43
AY	35	48	36.9	50.8	53.3	12.7	54
AA	35	54	36.9	57.2	59.7	12.7	63
AM	35	67	36.9	69.9	72.4	12.7	82
AB	35	79	36.9	82.6	85.1	12.7	105
AL	35	92	36.9	95.3	97.8	12.7	122
AC	35	105	36.9	108.0	110.5	12.7	129
AD	35	117	36.9	120.7	123.2	12.7	162
AE	35	130	36.9	133.4	125.9	12.7	179
AF	35	143	36.9	146.1	148.6	12.7	201
EN	44	41	46.4	44.5	47.0	19.1	71
EY	44	48	46.4	50.8	53.3	19.1	88
EA	44	54	46.4	57.2	59.7	19.1	102
EM	44	67	46.4	69.9	72.4	19.1	133
EB	44	79	46.4	82.6	85.1	19.1	167
EL	44	92	46.4	95.3	97.8	19.1	198
EC	44	105	46.4	108.0	110.5	19.1	230
ED	44	117	46.4	120.7	123.2	19.1	252
EE	44	130	46.4	133.4	135.9	19.1	269
EF	44	143	46.4	146.1	148.6	19.1	318
BY	51	48	52.8	50.8	53.3	22.2	113
BA	51	54	52.8	57.2	59.7	22.2	133
BM	51	67	52.8	69.9	72.4	22.2	176
BB	51	79	52.8	82.6	85.1	22.2	213
BL	51	92	52.8	95.3	97.8	22.2	261
BC	51	105	52.8	108.0	110.5	22.2	381
BD	51	117	52.8	120.7	123.2	22.2	326
BE	51	130	52.8	133.4	135.9	22.2	337
BF	51	143	52.8	146.1	148.6	22.2	408
CB	64	79	65.5	82.6	N/A	28.6	329
CL	64	92	65.5	95.3	N/A	28.6	400
CC	64	105	65.5	108.0	N/A	28.6	473
CD	64	117	65.5	120.7	N/A	28.6	562
CE	64	130	65.5	133.4	N/A	28.6	607
CF	64	143	65.5	146.1	N/A	28.6	675
DB	76	79	78.2	82.6	N/A	31.8	496
DL	76	92	78.2	95.3	N/A	31.8	598
DC	76	105	78.2	108.0	N/A	31.8	700
DD	76	117	78.2	120.7	N/A	31.8	802
DE	76	130	78.2	133.4	N/A	31.8	944
DF	76	143	78.2	146.1	N/A	31.8	1004
DJ	76	219	78.2	222.3	N/A	31.8	1403

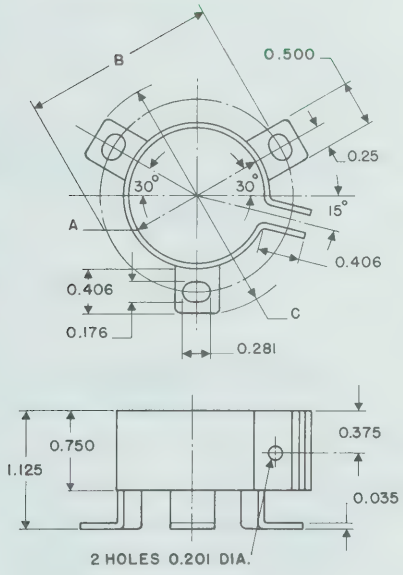
LARGE CAN BRACKETS (INCHES)

FIGURE 1



Dwg. No. A-14,749

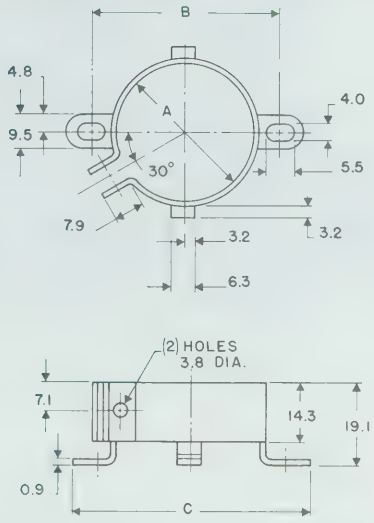
FIGURE 2



Dwg. No. A-14,855

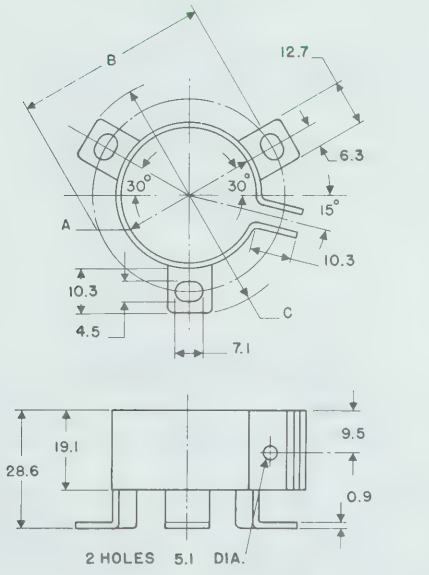
LARGE CAN BRACKETS (MILLIMETERS)

FIGURE 1



Dwg. No. A-14,750

FIGURE 2



Dwg. No. A-14,856

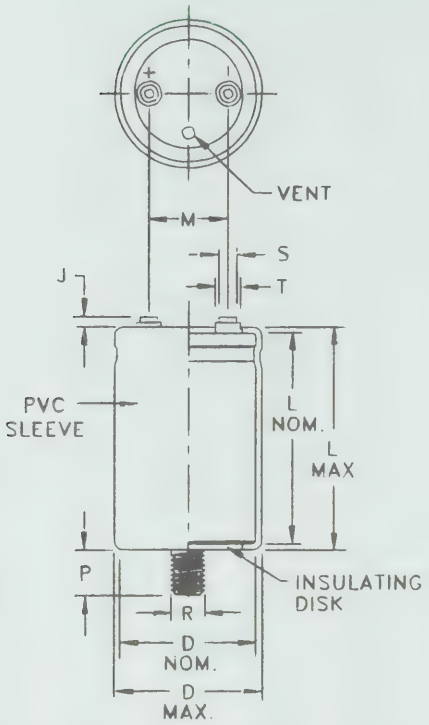
BRACKETS *

Type	Part Number	Bare Can Dia.	B	C	Figure Number
2 Feet	4586-97A	1.375	1.781	2.218	1
3 Feet	4586-48	2.000	2.500	2.875	2
3 Feet	4586-1	2.500	3.000	3.375	2
3 Feet	4586-2	3.000	3.500	3.875	2

Brackets are steel with zinc electroplate, plus a gold chromate post treatment.
Bracket hardware is included.

OUTLINE DRAWING
FOR STUD MOUNT OPTION (AS SPECIAL ORDER)
LARGE CAN CAPACITORS

SCREW—INSERT TERMINALS



(NOT AVAILABLE ON "DJ" CASE CODE, "E" DIAMETERS, AND "P" TERMINAL OPTION)

TERMINAL DIMENSIONS

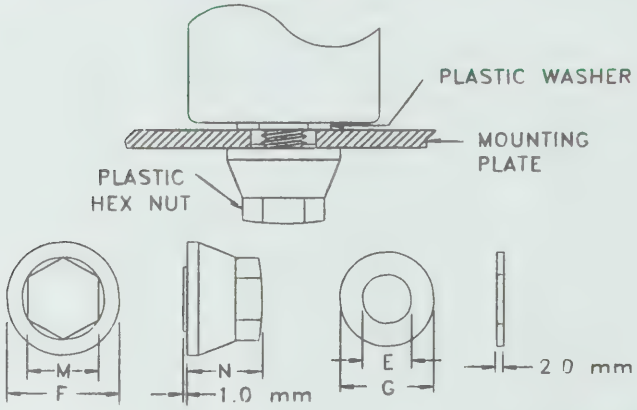
SEE PAGE 167 FOR DIMENSIONS

STUD DIMENSIONS

Case Diameter	R Thread	P ±1.0mm Height
A	M8	12
B, C, D	M12	16
E	N/A	N/A

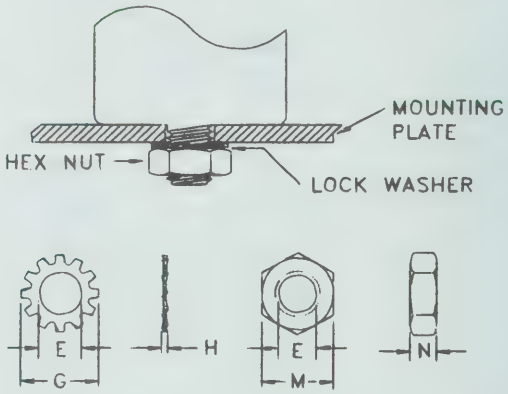
LARGE CAN MOUNTING KITS (INSULATED)

FIGURE 2



LARGE CAN MOUNTING KITS (UNINSULATED)

FIGURE 3



MOUNTING KITS

(Dimensions in Millimeters)

Type	Part Number	E	F	G	H	M	N	Figure Number
Insulated M8	50-8	8.4	25	25.0	–	17	15	2
Uninsulated M8	50-8A	8.4	–	14.0	0.8	13	4	3
Insulated M12	50-8B	13.0	30	25.0	–	19	20	2
Uninsulated M12	50-8C	13.0	–	20.5	1.0	19	7	3

+85°C and +95°C Large Can Aluminum Capacitors

L65-17

Features —

- **The Industry Standard for Large Can Aluminum Capacitors**
- **Ideal for High Wattage Power Supplies and Energy Storage Applications**
- **Largest Capacitance Available**
- **Highest Voltage Available**
- **Metric Threads and Stud Mount Versions Included**
- **Replaces Type 36DY**

General Specifications —

Operating Temperature:
−40°C to +95°C: 6.3 - 100 VDC.
−40°C to +85°C: 125 - 500 VDC.

Voltage Range: 6.3 - 500 VDC.

Capacitance Range: 100μF - 2.2F.

Capacitance Tolerance: −10%, +50%.

Case Size Range: 1.375″ x 1.625″ - 3.0″ x 8.675″.

Termination: Screw insert or solderable terminals.

Life Validation Test: 2000 hours at +85°C:
Δ CAP ≤ 15% from initial measurement.
Δ ESR ≤ 1.5x initial specified limit.
Δ DCL ≤ initial specified limit.

Shelf Test: 500 hours at +85°C:
Δ CAP ≤ 15% from initial measurement.
Δ ESR ≤ 1.2x initial specified limit.
Δ DCL ≤ 2x initial specified limit.

DC Leakage Current: 5 min. charge time.
$I = K\sqrt{CV}$
K = 4.0 at +25°C; 32.0 at +85°C.
C in μF, V in Volts, I in μA

Ripple Current Multipliers:

TEMPERATURE

Ambient Temperature	Multipliers
+85°C	1.0
+75°C	1.4
+65°C	1.7
+55°C & below	2.0

FREQUENCY Hz

Rated WVDC	120	400	1000 & Up
0-50	1.0	1.05	1.10
51-100	1.0	1.10	1.15
150-300	1.0	1.15	1.25
301-500	1.0	1.20	1.30

Performance Characteristics —

SEE PAGE 2.

Catalog Numbering System

36DA 393 F 6R3 AN 2 A

LEAD CODE: A = LOW INSERT 10-32 SCREW THREAD (Standard)
B = HIGH INSERT 10-32 SCREW THREAD
D = HIGH CURRENT ¼-28 SCREW THREAD
N = LOW INSERT M5 SCREW THREAD
P = KEYED POLARITY VERTICAL MOUNT*
T = HIGH INSERT M5 SCREW THREAD

CASE STYLE: 2 = PVC INSULATING SLEEVE (Standard)
5 = PVC SLEEVE WITH RESIN END SEAL
(Optional only on P Lead Code) Required for exposure to halogenated cleaning solvents.

CASE CODE. SEE DIMENSIONS, PAGE 168.

DC VOLTAGE RATING. EXPRESSED IN VOLTS. THE LETTER 'R' IS USED TO INDICATE A DECIMAL POINT. FOR EXAMPLE, 6R3 = 6.3 VOLTS.

CAPACITANCE TOLERANCE. F = −10%, +50%

CAPACITANCE. EXPRESSED IN MICROFARADS. THE FIRST TWO DIGITS ARE SIGNIFICANT FIGURES, THE THIRD IS THE NUMBER OF ZEROS.

TYPE NUMBER. IDENTIFIES THE BASIC CAPACITOR DESIGN.

*Available on 1.375″, 1.750″ and 2.000″ diameter units.

STANDARD RATINGS

µF	Catalog Number	Nominal Case Size (inch) D x L	Max. ESR 120Hz, +25°C (mΩ)	Max. Ripple Current 120Hz, +85°C (A)
6.3 VOLTS DC WORKING; 8 VOLTS DC SURGE				
39,000	36DA393F6R3AN2A	1.375 x 1.625	45.3	4.45
68,000	36DA683F6R3AA2A	1.375 x 2.125	28.9	6.13
82,000	36DA823F6R3AM2A	1.375 x 2.625	22.1	7.63
120,000	36DA124F6R3AB2A	1.375 x 3.125	18.3	9.00
150,000	36DA154F6R3AC2A	1.375 x 4.125	14.3	11.44
180,000	36DA184F6R3AD2A	1.375 x 4.625	13.1	12.54
220,000	36DA224F6R3AE2A	1.375 x 5.125	12.2	13.60
82,000	36DA823F6R3BY2A	2.000 x 1.875	21.9	8.62
120,000	36DA124F6R3BA2A	2.000 x 2.125	17.0	10.18
180,000	36DA184F6R3BM2A	2.000 x 2.625	12.1	13.02
220,000	36DA224F6R3BB2A	2.000 x 3.125	9.7	15.50
270,000	36DA274F6R3BL2A	2.000 x 3.625	8.3	17.73
330,000	36DA334F6R3BC2A	2.000 x 4.125	7.4	19.78
390,000	36DA394F6R3BD2A	2.000 x 4.625	6.7	21.80
470,000	36DA474F6R3BE2A	2.000 x 5.125	6.2	23.64
390,000	36DA394F6R3CB2A	2.500 x 3.125	6.3	22.22
560,000	36DA564F6R3CC2A	2.500 x 4.125	4.8	28.12
680,000	36DA684F6R3CD2D	2.500 x 4.625	4.4	30.70
820,000	36DA824F6R3CE2D	2.500 x 5.125	4.1	34.40
680,000	36DA684F6R3DL2A	3.000 x 3.625	5.5	28.10
820,000	36DA824F6R3DC2D	3.000 x 4.125	4.9	31.20
1,000,000	36DA105F6R3DD2D	3.000 x 4.625	4.5	34.00
1,200,000	36DA125F6R3DE2D	3.000 x 5.125	4.3	36.20
2,200,000	36DA225F6R3DJ2D	3.000 x 8.625	3.2	51.78
10 VOLTS DC WORKING; 12 VOLTS DC SURGE				
27,000	36DA273F010AN2A	1.375 x 1.625	46.3	4.40
47,000	36DA473F010AA2A	1.375 x 2.125	29.5	6.07
68,000	36DA683F010AM2A	1.375 x 2.625	22.5	7.56
82,000	36DA823F010AB2A	1.375 x 3.125	18.6	8.93
100,000	36DA104F010AL2A	1.375 x 3.625	16.2	10.16
120,000	36DA124F010AC2A	1.375 x 4.125	14.5	11.36
150,000	36DA154F010AD2A	1.375 x 4.625	13.3	12.44
180,000	36DA184F010AF2A	1.375 x 5.625	11.6	14.55
68,000	36DA683F010BY2A	2.000 x 1.875	22.3	8.54
82,000	36DA823F010BA2A	2.000 x 2.125	17.3	10.09
120,000	36DA124F010BM2A	2.000 x 2.625	12.3	12.91
180,000	36DA184F010BB2A	2.000 x 3.125	9.9	15.34
220,000	36DA224F010BL2A	2.000 x 3.625	8.4	17.62
270,000	36DA274F010BC2A	2.000 x 4.125	7.5	19.65
330,000	36DA334F010BE2A	2.000 x 5.125	6.3	23.45
390,000	36DA394F010BF2A	2.000 x 5.625	5.9	25.21
270,000	36DA274F010CB2A	2.500 x 3.125	6.4	21.90
470,000	36DA474F010CC2A	2.500 x 4.125	5.0	27.60
560,000	36DA564F010CE2A	2.500 x 5.125	4.8	28.30
680,000	36DA684F010CF2D	2.500 x 5.625	4.2	34.00
560,000	36DA564F010DL2A	3.000 x 3.625	5.5	28.10
680,000	36DA684F010DC2D	3.000 x 4.125	5.0	30.90
820,000	36DA824F010DD2D	3.000 x 4.625	4.5	34.00
1,000,000	36DA105F010DF2D	3.000 x 5.625	4.1	38.40
1,500.000	36DA155F010DJ2D	3.000 x 8.625	3.2	51.80

STANDARD RATINGS

µF	Catalog Number	Nominal Case Size (inch) D x L	Max. ESR 120Hz, +25°C (mΩ)	Max. Ripple Current 120Hz, +85°C (A)
16 VOLTS DC WORKING; 20 VOLTS DC SURGE				
18,000	36DA183F016AN2A	1.375 x 1.625	47.7	4.30
33,000	36DA333F016AA2A	1.375 x 2.125	30.4	5.90
47,000	36DA473F016AM2A	1.375 x 2.625	23.1	7.40
56,000	36DA563F016AB2A	1.375 x 3.125	19.1	8.80
68,000	36DA683F016AL2A	1.375 x 3.625	16.6	10.00
82,000	36DA823F016AC2A	1.375 x 4.125	14.8	11.20
100,000	36DA104F016AD2A	1.375 x 4.625	13.6	12.30
120,000	36DA124F016AF2A	1.375 x 5.625	11.8	14.40
39,000	36DA393F016BY2A	2.000 x 1.875	23.0	8.40
56,000	36DA563F016BA2A	2.000 x 2.125	17.7	9.90
82,000	36DA823F016BM2A	2.000 x 2.625	12.6	12.70
120,000	36DA124F016BB2A	2.000 x 3.125	10.1	15.10
150,000	36DA154F016BL2A	2.000 x 3.625	8.6	17.40
180,000	36DA184F016BC2A	2.000 x 4.125	7.6	19.50
220,000	36DA224F016BE2A	2.000 x 5.125	6.4	23.20
270,000	36DA274F016BF2A	2.000 x 5.625	6.0	25.00
180,000	36DA184F016CB2A	2.500 x 3.125	6.6	21.60
270,000	36DA274F016CC2A	2.500 x 4.125	5.1	27.20
330,000	36DA334F016CD2A	2.500 x 4.625	4.8	29.40
390,000	36DA394F016CE2D	2.500 x 5.125	4.7	30.10
470,000	36DA474F016CF2D	2.500 x 5.625	4.2	33.30
390,000	36DA394F016DL2A	3.000 x 3.625	5.5	28.10
470,000	36DA474F016DC2D	3.000 x 4.125	5.3	30.80
560,000	36DA564F016DE2D	3.000 x 5.125	4.3	36.10
680,000	36DA684F016DF2D	3.000 x 5.625	4.1	38.30
1,000,000	36DA105F016DJ2D	3.000 x 8.625	3.2	51.70
25 VOLTS DC WORKING; 30 VOLTS DC SURGE				
8,200	36DA822F025AN2A	1.375 x 1.625	51.5	4.10
12,000	36DA123F025AA2A	1.375 x 2.125	32.6	5.70
18,000	36DA183F025AM2A	1.375 x 2.625	24.7	7.20
27,000	36DA273F025AB2A	1.375 x 3.125	20.3	8.50
33,000	36DA333F025AL2A	1.375 x 3.625	17.6	9.70
39,000	36DA393F025AC2A	1.375 x 4.125	15.7	10.90
47,000	36DA473F025AE2A	1.375 x 5.125	13.2	13.00
56,000	36DA563F025AF2A	1.375 x 5.625	12.4	14.00
18,000	36DA183F025BY2A	2.000 x 1.875	25.1	8.00
22,000	36DA223F025BA2A	2.000 x 2.125	19.3	9.50
39,000	36DA393F025BM2A	2.000 x 2.625	13.7	12.20
47,000	36DA473F025BB2A	2.000 x 3.125	10.9	14.60
68,000	36DA683F025BL2A	2.000 x 3.625	9.2	16.80
82,000	36DA823F025BC2A	2.000 x 4.125	8.1	18.90
100,000	36DA104F025BE2A	2.000 x 5.125	6.8	22.50
120,000	36DA124F025BF2A	2.000 x 5.625	6.3	24.30
82,000	36DA823F025CB2A	2.500 x 3.125	8.9	18.60
120,000	36DA124F025CC2A	2.500 x 4.125	6.7	23.80
150,000	36DA154F025CD2A	2.500 x 4.625	6.0	26.30
180,000	36DA184F025CE2A	2.500 x 5.125	5.6	28.40
150,000	36DA154F025DL2A	3.000 x 3.625	5.8	27.40
180,000	36DA184F025DC2D	3.000 x 4.125	5.2	30.30
220,000	36DA224F025DD2D	3.000 x 4.625	4.9	32.60
270,000	36DA274F025DE2D	3.000 x 5.125	4.5	35.30
470,000	36DA474F025DJ2D	3.000 x 8.625	3.5	49.50

STANDARD RATINGS

µF	Catalog Number	Nominal Case Size (inch) D x L	Max. ESR 120Hz, +25°C (mΩ)	Max. Ripple Current 120Hz, +85°C (A)
35 VOLTS DC WORKING; 40 VOLTS DC SURGE				
5,600	36DA562F035AN2A	1.375 x 1.625	63.9	3.70
10,000	36DA103F035AA2A	1.375 x 2.125	39.9	5.20
15,000	36DA153F035AM2A	1.375 x 2.625	29.9	6.50
18,000	36DA183F035AB2A	1.375 x 3.125	24.3	7.80
22,000	36DA223F035AL2A	1.375 x 3.625	20.9	8.90
27,000	36DA273F035AC2A	1.375 x 4.125	18.5	10.00
33,000	36DA333F035AD2A	1.375 x 4.625	16.7	11.10
39,000	36DA393F035AE2A	1.375 x 5.125	15.4	12.10
12,000	36DA123F035BY2A	2.000 x 1.875	33.1	7.00
18,000	36DA183F035BA2A	2.000 x 2.125	25.2	8.30
27,000	36DA273F035BM2A	2.000 x 2.625	17.6	10.70
39,000	36DA393F035BB2A	2.000 x 3.125	13.8	12.90
47,000	36DA473F035BL2A	2.000 x 3.625	11.5	15.00
56,000	36DA563F035BC2A	2.000 x 4.125	10.0	17.00
68,000	36DA683F035BD2A	2.000 x 4.625	9.0	18.80
82,000	36DA823F035BE2A	2.000 x 5.125	8.2	20.50
68,000	36DA683F035CB2A	2.500 x 3.125	8.9	18.60
100,000	36DA104F035CC2A	2.500 x 4.125	6.7	23.80
120,000	36DA124F035CD2A	2.500 x 4.625	6.2	25.90
150,000	36DA154F035CF2D	2.500 x 5.625	5.2	30.60
120,000	36DA124F035DL2A	3.000 x 3.625	9.8	21.00
150,000	36DA154F035DC2A	3.000 x 4.125	8.5	23.60
180,000	36DA184F035DD2A	3.000 x 4.625	7.5	26.30
220,000	36DA224F035DF2D	3.000 x 5.625	6.2	31.20
330,000	36DA334F035DJ2D	3.000 x 8.625	4.5	43.60
50 VOLTS DC WORKING; 63 VOLTS DC SURGE				
3,900	36DA392F050AN2A	1.375 x 1.625	64.0	3.70
6,800	36DA682F050AA2A	1.375 x 2.125	40.0	5.20
10,000	36DA103F050AM2A	1.375 x 2.625	29.0	6.60
12,000	36DA123F050AB2A	1.375 x 3.125	24.0	7.80
15,000	36DA153F050AL2A	1.375 x 3.625	20.0	9.10
18,000	36DA183F050AC2A	1.375 x 4.125	18.2	10.10
22,000	36DA223F050AD2A	1.375 x 4.625	16.3	11.20
27,000	36DA273F050AF2A	1.375 x 5.625	14.0	13.20
8,200	36DA822F050BY2A	2.000 x 1.875	31.0	7.20
12,000	36DA123F050BA2A	2.000 x 2.125	24.0	8.50
18,000	36DA183F050BM2A	2.000 x 2.625	16.9	11.00
27,000	36DA273F050BB2A	2.000 x 3.125	13.3	13.20
33,000	36DA333F050BL2A	2.000 x 3.625	11.9	14.80
39,000	36DA393F050BC2A	2.000 x 4.125	10.4	16.60
47,000	36DA473F050BD2A	2.000 x 4.625	8.9	18.90
56,000	36DA563F050BF2A	2.000 x 5.625	7.7	22.00
47,000	36DA473F050CB2A	2.500 x 3.125	9.5	18.10
68,000	36DA683F050CC2A	2.500 x 4.125	7.1	23.10
82,000	36DA823F050CD2A	2.500 x 4.625	6.4	25.50
100,000	36DA104F050CF2A	2.500 x 5.625	5.9	28.10
82,000	36DA823F050DL2A	3.000 x 3.625	6.2	26.50
100,000	36DA104F050DC2A	3.000 x 4.125	5.6	29.20
120,000	36DA124F050DD2D	3.000 x 4.625	5.1	31.90
150,000	36DA154F050DF2D	3.000 x 5.625	4.5	36.70
220,000	36DA224F050DJ2D	3.000 x 8.625	3.6	48.80

STANDARD RATINGS

µF	Catalog Number	Nominal Case Size (inch) D x L	Max. ESR 120Hz, +25°C (mΩ)	Max. Ripple Current 120Hz, +85°C (A)
63 VOLTS DC WORKING; 79 VOLTS DC SURGE				
2,700	36DA272F063AN2A	1.375 x 1.625	69.0	3.62
4,700	36DA472F063AA2A	1.375 x 2.125	42.0	5.10
6,800	36DA682F063AM2A	1.375 x 2.625	31.0	6.47
8,200	36DA822F063AB2A	1.375 x 3.125	25.0	7.72
10,000	36DA103F063AL2A	1.375 x 3.625	22.0	8.75
12,000	36DA123F063AC2A	1.375 x 4.125	19.2	9.87
15,000	36DA153F063AD2A	1.375 x 4.625	17.2	11.00
18,000	36DA183F063AE2A	1.375 x 5.125	15.7	12.00
6,800	36DA682F063BY2A	2.000 x 1.875	32.0	7.08
8,200	36DA822F063BA2A	2.000 x 2.125	25.0	8.42
12,000	36DA123F063BM2A	2.000 x 2.625	17.4	10.90
18,000	36DA183F063BB2A	2.000 x 3.125	13.9	13.00
22,000	36DA223F063BL2A	2.000 x 3.625	11.7	15.00
27,000	36DA273F063BC2A	2.000 x 4.125	10.2	16.90
33,000	36DA333F063BD2A	2.000 x 4.625	9.1	18.70
39,000	36DA393F063BF2A	2.000 x 5.625	7.8	21.90
27,000	36DA273F063CB2A	2.500 x 3.125	9.7	17.90
47,000	36DA473F063CC2A	2.500 x 4.125	7.3	22.80
56,000	36DA563F063CD2A	2.500 x 4.625	6.6	25.10
68,000	36DA683F063CF2A	2.500 x 5.625	5.7	29.20
56,000	36DA563F063DL2A	3.000 x 3.625	6.3	26.30
68,000	36DA683F063DC2A	3.000 x 4.125	5.7	28.90
82,000	36DA823F063DD2D	3.000 x 4.625	5.2	31.60
100,000	36DA104F063DF2D	3.000 x 5.625	4.5	36.70
150,000	36DA154F063DJ2D	3.000 x 8.625	3.7	48.20
100 VOLTS DC WORKING; 125 VOLTS DC SURGE				
1,200	36DA122F100AN2A	1.375 x 1.625	116.5	2.70
2,200	36DA222F100AA2A	1.375 x 2.125	70.9	3.90
3,300	36DA332F100AM2A	1.375 x 2.625	51.8	4.90
3,900	36DA392F100AB2A	1.375 x 3.125	41.4	5.90
4,700	36DA472F100AL2A	1.375 x 3.625	34.7	6.90
5,600	36DA562F100AC2A	1.375 x 4.125	30.2	7.80
6,800	36DA682F100AD2A	1.375 x 4.625	25.0	9.43
8,200	36DA822F100AF2A	1.375 x 5.625	22.3	10.40
2,700	36DA272F100BY2A	2.000 x 1.875	59.0	5.27
3,900	36DA392F100BA2A	2.000 x 2.125	46.0	6.19
5,600	36DA562F100BM2A	2.000 x 2.625	30.0	8.29
8,200	36DA822F100BB2A	2.000 x 3.125	23.0	10.00
10,000	36DA103F100BL2A	2.000 x 3.625	18.9	11.80
12,000	36DA123F100BC2A	2.000 x 4.125	16.3	13.30
15,000	36DA153F100BD2A	2.000 x 4.625	14.8	14.70
18,000	36DA183F100BF2A	2.000 x 5.625	12.3	17.40
15,000	36DA153F100CB2A	2.500 x 3.125	14.8	14.50
18,000	36DA183F100CC2A	2.500 x 4.125	10.4	19.10
22,000	36DA223F100CD2A	2.500 x 4.625	9.5	20.90
27,000	36DA273F100CE2A	2.500 x 5.125	8.6	22.90
33,000	36DA333F100CF2A	2.500 x 5.625	7.8	25.00
27,000	36DA273F100DL2A	3.000 x 3.625	11.2	19.70
33,000	36DA333F100DC2A	3.000 x 4.125	9.7	22.20
39,000	36DA393F100DD2A	3.000 x 4.625	8.6	24.50
47,000	36DA473F100DF2A	3.000 x 5.625	7.0	29.30
68,000	36DA683F100DJ2D	3.000 x 8.625	5.4	39.90

STANDARD RATINGS

µF	Catalog Number	Nominal Case Size (inch) D x L	Max. ESR 120Hz, +25°C (mΩ)	Max. Ripple Current 120Hz, +85°C (A)
160 VOLTS DC WORKING; 200 VOLTS DC SURGE				
560	36DA561F160AN2A	1.375 x 1.625	242.1	1.50
1,000	36DA102F160AA2A	1.375 x 2.125	145.0	2.20
1,500	36DA152F160AM2A	1.375 x 2.625	104.4	2.80
1,800	36DA182F160AB2A	1.375 x 3.125	82.1	3.40
2,200	36DA222F160AL2A	1.375 x 3.625	68.0	4.00
2,700	36DA272F160AC2A	1.375 x 4.125	58.2	4.60
3,300	36DA332F160AD2A	1.375 x 4.625	51.1	5.10
3,900	36DA392F160AE2A	1.375 x 5.125	45.7	5.70
1,200	36DA122F160BY2A	2.000 x 1.875	174.9	2.40
1,800	36DA182F160BA2A	2.000 x 2.125	131.2	2.90
2,700	36DA272F160BM2A	2.000 x 2.625	88.3	3.90
3,900	36DA392F160BB2A	2.000 x 3.125	67.3	4.80
4,700	36DA472F160BL2A	2.000 x 3.625	54.7	5.60
5,600	36DA562F160BC2A	2.000 x 4.125	46.4	6.40
6,800	36DA682F160BD2A	2.000 x 4.625	40.5	7.20
8,200	36DA822F160BE2A	2.000 x 5.125	36.1	7.90
6,800	36DA682F160CB2A	2.500 x 3.125	33.7	7.80
10,000	36DA103F160CC2A	2.500 x 4.125	23.3	10.40
12,000	36DA123F160CD2A	2.500 x 4.625	20.3	11.60
15,000	36DA153F160CF2A	2.500 x 5.625	16.4	14.00
12,000	36DA123F160DL2A	3.000 x 3.625	29.4	9.90
15,000	36DA153F160DC2A	3.000 x 4.125	24.9	11.30
18,000	36DA183F160DD2A	3.000 x 4.625	21.7	12.60
22,000	36DA223F160DF2A	3.000 x 5.625	17.4	15.20
33,000	36DA333F160DJ2A	3.000 x 8.625	11.5	22.30
200 VOLTS DC WORKING; 250 VOLTS DC SURGE				
470	36DA471F200AN2A	1.375 x 1.625	254.0	1.54
680	36DA681F200AA2A	1.375 x 2.125	150.0	2.20
1,000	36DA102F200AM2A	1.375 x 2.625	102.0	2.90
1,500	36DA152F200AB2A	1.375 x 3.125	84.0	3.43
1,800	36DA182F200AL2A	1.375 x 3.625	70.0	4.00
2,200	36DA222F200AD2A	1.375 x 4.625	57.9	4.80
2,700	36DA272F200AE2A	1.375 x 5.125	47.0	5.66
1,000	36DA102F200BY2A	2.000 x 1.875	158.0	2.62
1,200	36DA122F200BA2A	2.000 x 2.125	108.0	3.30
2,200	36DA222F200BM2A	2.000 x 2.625	72.0	4.36
2,700	36DA272F200BB2A	2.000 x 3.125	60.0	5.09
3,300	36DA332F200BL2A	2.000 x 3.625	49.0	5.97
3,900	36DA392F200BC2A	2.000 x 4.125	40.0	6.95
4,700	36DA472F200BD2A	2.000 x 4.625	33.0	8.02
5,600	36DA562F200BE2A	2.000 x 5.125	33.0	8.39
6,800	36DA682F200BF2A	2.000 x 5.625	23.0	10.42
4,700	36DA472F200CB2A	2.500 x 3.125	32.0	8.03
6,800	36DA682F200CC2A	2.500 x 4.125	22.0	10.73
8,200	36DA822F200CD2A	2.500 x 4.625	19.0	12.07
10,000	36DA103F200CE2A	2.500 x 5.125	19.7	12.80
8,200	36DA822F200DL2A	3.000 x 3.625	20.0	12.04
10,000	36DA103F200DC2A	3.000 x 4.125	20.0	12.50
12,000	36DA123F200DD2A	3.000 x 4.625	17.0	14.27
15,000	36DA153F200DE2A	3.000 x 5.125	14.0	16.36
27,000	36DA273F200DJ2A	3.000 x 8.625	8.0	26.75

STANDARD RATINGS

µF	Catalog Number	Nominal Case Size (inch) D x L	Max. ESR 120Hz, +25°C (mΩ)	Max. Ripple Current 120Hz, +85°C (A)
250 VOLTS DC WORKING; 300 VOLTS DC SURGE				
330	36DA331F250AN2A	1.375 x 1.625	275.0	1.48
560	36DA561F250AA2A	1.375 x 2.125	158.0	2.15
820	36DA821F250AM2A	1.375 x 2.625	132.0	2.55
1,000	36DA102F250AB2A	1.375 x 3.125	90.0	3.31
1,200	36DA122F250AL2A	1.375 x 3.625	74.0	3.89
1,500	36DA152F250AC2A	1.375 x 4.125	62.0	4.49
1,800	36DA182F250AD2A	1.375 x 4.625	65.4	4.55
2,200	36DA222F250AE2A	1.375 x 5.125	49.0	5.54
820	36DA821F250BY2A	2.000 x 1.875	165.0	2.56
1,000	36DA102F250BA2A	2.000 x 2.125	113.0	3.23
1,500	36DA152F250BM2A	2.000 x 2.625	77.0	4.21
2,200	36DA222F250BB2A	2.000 x 3.125	62.0	5.01
2,700	36DA272F250BL2A	2.000 x 3.625	51.0	5.85
3,300	36DA332F250BC2A	2.000 x 4.125	42.0	6.78
3,900	36DA392F250BD2A	2.000 x 4.625	34.0	7.90
4,700	36DA472F250BF2A	2.000 x 5.625	29.0	9.44
3,900	36DA392F250CB2A	2.500 x 3.125	34.0	7.79
5,600	36DA562F250CC2A	2.500 x 4.125	23.0	10.49
6,800	36DA682F250CD2A	2.500 x 4.625	19.0	12.07
8,200	36DA822F250CF2A	2.500 x 5.625	16.0	14.23
6,800	36DA682F250DL2A	3.000 x 3.625	24.0	10.99
8,200	36DA822F250DC2A	3.000 x 4.125	20.0	12.61
10,000	36DA103F250DD2A	3.000 x 4.625	17.0	14.27
12,000	36DA123F250DF2A	3.000 x 5.625	11.0	19.14
18,000	36DA183F250DJ2A	3.000 x 8.625	8.0	26.75
300 VOLTS DC WORKING; 350 VOLTS DC SURGE				
220	36DA221F300AN2A	1.375 x 1.625	833.0	0.85
390	36DA391F300AA2A	1.375 x 2.125	548.0	1.15
560	36DA561F300AM2A	1.375 x 2.625	351.0	1.56
680	36DA681F300AB2A	1.375 x 3.125	259.0	1.96
820	36DA821F300AL2A	1.375 x 3.625	220.0	2.25
1,000	36DA102F300AC2A	1.375 x 4.125	175.0	2.67
1,200	36DA122F300AD2A	1.375 x 4.625	162.0	2.91
1,500	36DA152F300AE2A	1.375 x 5.125	118.0	3.60
560	36DA561F300BY2A	2.000 x 1.875	386.0	1.68
680	36DA681F300BA2A	2.000 x 2.125	268.0	2.09
1,200	36DA122F300BM2A	2.000 x 2.625	191.0	2.68
1,500	36DA152F300BB2A	2.000 x 3.125	149.0	3.23
1,800	36DA182F300BL2A	2.000 x 3.625	124.0	3.74
2,200	36DA222F300BC2A	2.000 x 4.125	105.0	4.29
2,700	36DA272F300BD2A	2.000 x 4.625	98.0	4.65
3,300	36DA332F300BF2A	2.000 x 5.625	72.0	5.89
2,700	36DA272F300CB2A	2.500 x 3.125	88.0	4.84
3,900	36DA392F300CC2A	2.500 x 4.125	58.0	6.60
4,700	36DA472F300CD2A	2.500 x 4.625	48.0	7.59
5,600	36DA562F300CF2A	2.500 x 5.625	39.0	8.95
4,700	36DA472F300DL2A	3.000 x 3.625	50.0	7.61
5,600	36DA562F300DC2A	3.000 x 4.125	41.0	8.81
6,800	36DA682F300DD2A	3.000 x 4.625	34.9	9.95
8,200	36DA822F300DE2A	3.000 x 5.125	32.0	10.82
12,000	36DA123F300DJ2A	3.000 x 8.625	17.5	18.08

STANDARD RATINGS

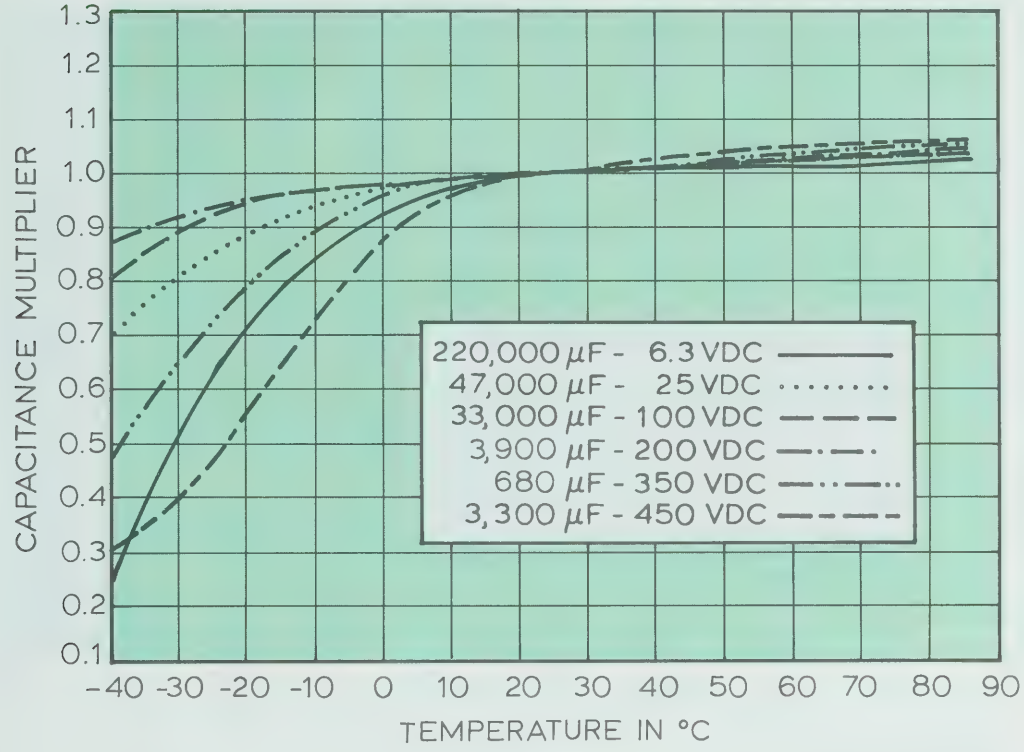
µF	Catalog Number	Nominal Case Size (inch) D x L	Max. ESR 120Hz, +25°C (mΩ)	Max. Ripple Current 120Hz, +85°C (A)
350 VOLTS DC WORKING; 400 VOLTS DC SURGE				
180	36DA181F350AN2A	1.375 x 1.625	853.0	0.84
270	36DA271F350AA2A	1.375 x 2.125	590.6	1.12
470	36DA471F350AM2A	1.375 x 2.625	388.0	1.49
560	36DA561F350AB2A	1.375 x 3.125	272.0	1.91
680	36DA681F350AL2A	1.375 x 3.625	228.0	2.21
820	36DA821F350AC2A	1.375 x 4.125	188.0	2.58
1,000	36DA102F350AD2A	1.375 x 4.625	177.0	2.70
1,200	36DA122F350AF2A	1.375 x 5.625	128.0	3.58
390	36DA391F350BY2A	2.000 x 1.875	412.0	1.62
560	36DA561F350BA2A	2.000 x 2.125	289.0	2.02
820	36DA821F350BM2A	2.000 x 2.625	200.0	2.61
1,200	36DA122F350BB2A	2.000 x 3.125	166.0	3.06
1,500	36DA152F350BL2A	2.000 x 3.625	136.0	3.58
1,800	36DA182F350BC2A	2.000 x 4.125	113.0	4.13
2,200	36DA222F350BE2A	2.000 x 5.125	94.3	4.94
2,700	36DA272F350BF2A	2.000 x 5.625	76.0	5.73
1,800	36DA182F350CB2A	2.500 x 3.125	90.0	4.79
2,700	36DA272F350CC2A	2.500 x 4.125	61.0	6.44
3,300	36DA332F350CD2A	2.500 x 4.625	50.0	7.44
3,900	36DA392F350CE2A	2.500 x 5.125	48.0	7.92
4,700	36DA472F350CF2A	2.500 x 5.625	41.0	8.89
3,900	36DA392F350DL2A	3.000 x 3.625	53.0	7.39
4,700	36DA472F350DC2A	3.000 x 4.125	44.0	8.50
5,600	36DA562F350DD2A	3.000 x 4.625	37.0	9.68
6,800	36DA682F350DF2A	3.000 x 5.625	36.0	10.50
10,000	36DA103F350DJ2A	3.000 x 8.625	18.0	17.83
400 VOLTS DC WORKING; 450 VOLTS DC SURGE				
150	36DA151F400AN2A	1.375 x 1.625	964.0	0.79
270	36DA271F400AA2A	1.375 x 2.125	643.0	1.06
390	36DA391F400AM2A	1.375 x 2.625	429.0	1.41
470	36DA471F400AB2A	1.375 x 3.125	351.0	1.68
560	36DA561F400AL2A	1.375 x 3.625	246.0	2.13
680	36DA681F400AC2A	1.375 x 4.125	207.0	2.58
820	36DA821F400AD2A	1.375 x 4.625	192.0	2.67
1,000	36DA102F400AE2A	1.375 x 5.125	170.0	2.98
390	36DA391F400BY2A	2.000 x 1.875	466.0	1.54
470	36DA471F400BA2A	2.000 x 2.125	372.0	1.78
680	36DA681F400BM2A	2.000 x 2.625	219.0	2.50
1,000	36DA102F400BB2A	2.000 x 3.125	181.0	2.93
1,200	36DA122F400BL2A	2.000 x 3.625	150.0	3.41
1,500	36DA152F400BC2A	2.000 x 4.125	123.0	3.96
1,800	36DA182F400BD2A	2.000 x 4.625	102.0	4.56
2,200	36DA222F400BF2A	2.000 x 5.625	82.0	5.52
1,800	36DA182F400CB2A	2.500 x 3.125	101.0	4.52
2,700	36DA272F400CC2A	2.500 x 4.125	67.0	5.15
3,300	36DA332F400CE2A	2.500 x 5.125	55.0	7.39
3,900	36DA392F400CF2A	2.500 x 5.625	45.0	8.48
3,300	36DA332F400DL2A	3.000 x 3.625	59.0	7.01
3,900	36DA392F400DC2A	3.000 x 4.125	48.0	8.14
4,700	36DA472F400DD2A	3.000 x 4.625	39.0	9.42
5,600	36DA562F400DF2A	3.000 x 5.625	34.6	10.78
8,200	36DA822F400DJ2A	3.000 x 8.625	19.0	17.36

STANDARD RATINGS

µF	Catalog Number	Nominal Case Size (inch) D x L	Max. ESR 120Hz, +25°C (mΩ)	Max. Ripple Current 120Hz, +85°C (A)
450 VOLTS DC WORKING; 500 VOLTS DC SURGE				
120	36DA121F450AN2A	1.375 x 1.625	1048.0	0.76
220	36DA221F450AA2A	1.375 x 2.125	582.0	1.12
330	36DA331F450AM2A	1.375 x 2.625	388.0	1.45
390	36DA391F450AB2A	1.375 x 3.125	317.0	1.77
470	36DA471F450AL2A	1.375 x 3.625	269.0	2.04
560	36DA561F450AC2A	1.375 x 4.125	223.0	2.37
680	36DA681F450AD2A	1.375 x 4.625	187.0	2.71
820	36DA821F450AE2A	1.375 x 5.125	164.0	3.13
270	36DA271F450BY2A	2.000 x 1.875	419.0	1.61
390	36DA391F450BA2A	2.000 x 2.125	343.0	1.85
560	36DA561F450BM2A	2.000 x 2.625	241.0	2.38
820	36DA821F450BB2A	2.000 x 3.125	166.0	3.06
1,000	36DA102F450BL2A	2.000 x 3.625	138.0	3.55
1,200	36DA122F450BC2A	2.000 x 4.125	113.0	4.13
1,500	36DA152F450BD2A	2.000 x 4.625	94.0	4.75
1,800	36DA182F450BF2A	2.000 x 5.625	75.0	5.77
1,500	36DA152F450CB2A	2.500 x 3.125	93.0	4.71
2,200	36DA222F450CC2A	2.500 x 4.125	62.0	6.39
2,700	36DA272F450CE2A	2.500 x 5.125	56.4	7.30
3,300	36DA332F450CF2A	2.500 x 5.625	42.0	8.78
2,700	36DA272F450DL2A	3.000 x 3.625	54.0	7.33
3,300	36DA332F450DC2A	3.000 x 4.125	44.0	8.50
3,900	36DA392F450DD2A	3.000 x 4.625	36.0	10.20
4,700	36DA472F450DF2A	3.000 x 5.625	34.0	10.88
6,800	36DA682F450DJ2A	3.000 x 8.625	21.0	16.51
500 VOLTS DC WORKING; 525 VOLTS DC SURGE				
100	36DA101F500AN2A	1.375 x 1.625	1535.6	0.60
150	36DA151F500AA2A	1.375 x 2.125	907.8	0.80
220	36DA221F500AM2A	1.375 x 2.625	645.3	1.10
270	36DA271F500AB2A	1.375 x 3.125	501.1	1.40
390	36DA391F500AL2A	1.375 x 3.625	409.9	1.60
470	36DA471F500AD2A	1.375 x 4.625	301.1	2.10
560	36DA561F500AE2A	1.375 x 5.125	266.1	2.30
680	36DA681F500AF2A	1.375 x 5.625	238.5	2.60
220	36DA221F500BY2A	2.000 x 1.875	719.0	1.20
270	36DA271F500BA2A	2.000 x 2.125	534.8	1.40
470	36DA471F500BM2A	2.000 x 2.625	354.6	1.90
560	36DA561F500BB2A	2.000 x 3.125	265.9	2.40
680	36DA681F500BL2A	2.000 x 3.625	213.1	2.80
820	36DA821F500BC2A	2.000 x 4.125	178.1	3.20
1,000	36DA102F500BD2A	2.000 x 4.625	153.2	3.70
1,200	36DA122F500BE2A	2.000 x 5.125	134.6	4.10

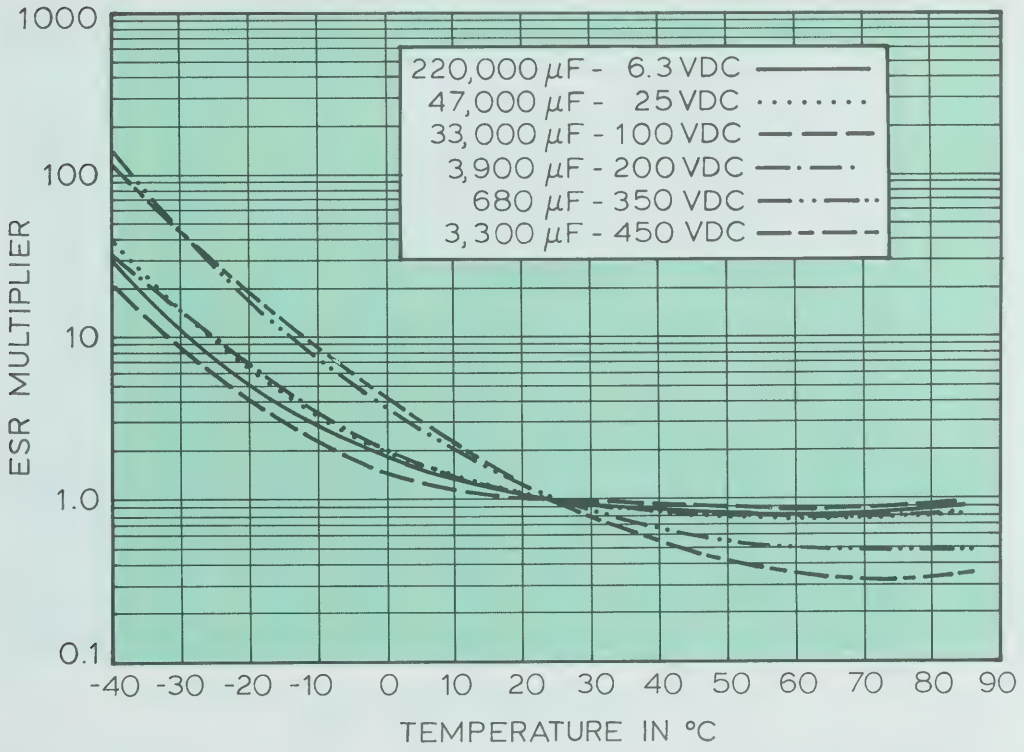
TYPICAL CURVES

TYPE 36DA — TYPICAL CAPACITANCE MULTIPLIER VS. TEMPERATURE @ 120 Hz



Dwg. No. A-14,714

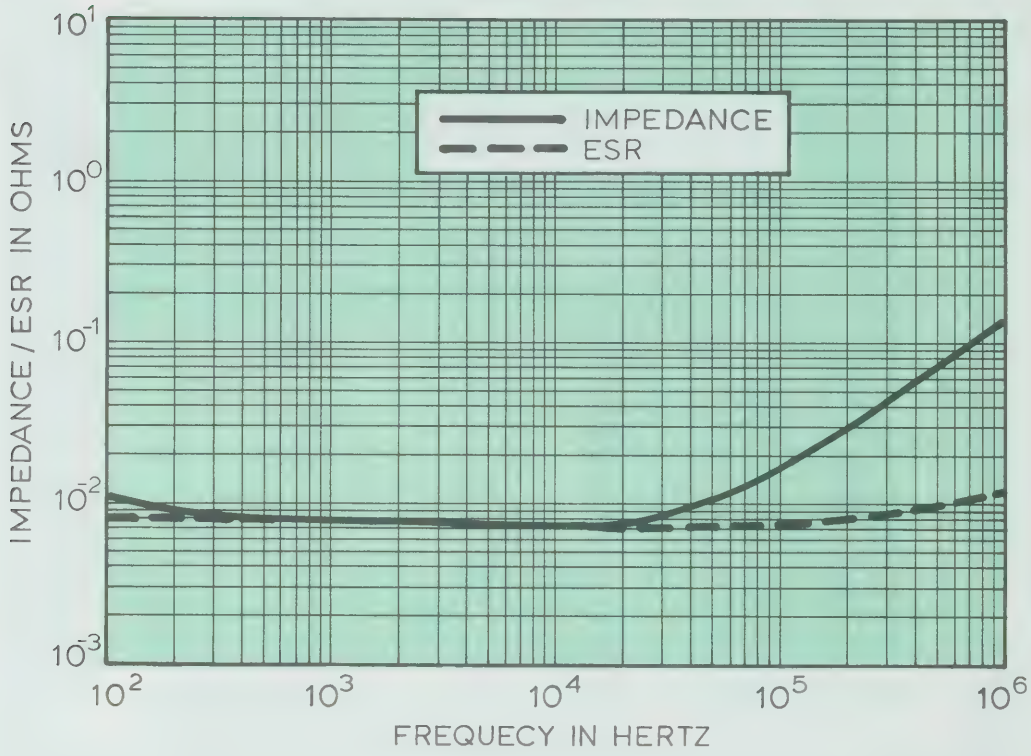
TYPE 36DA — TYPICAL ESR MULTIPLIER VS. TEMPERATURE @ 120 Hz



Dwg. No. A-14,722

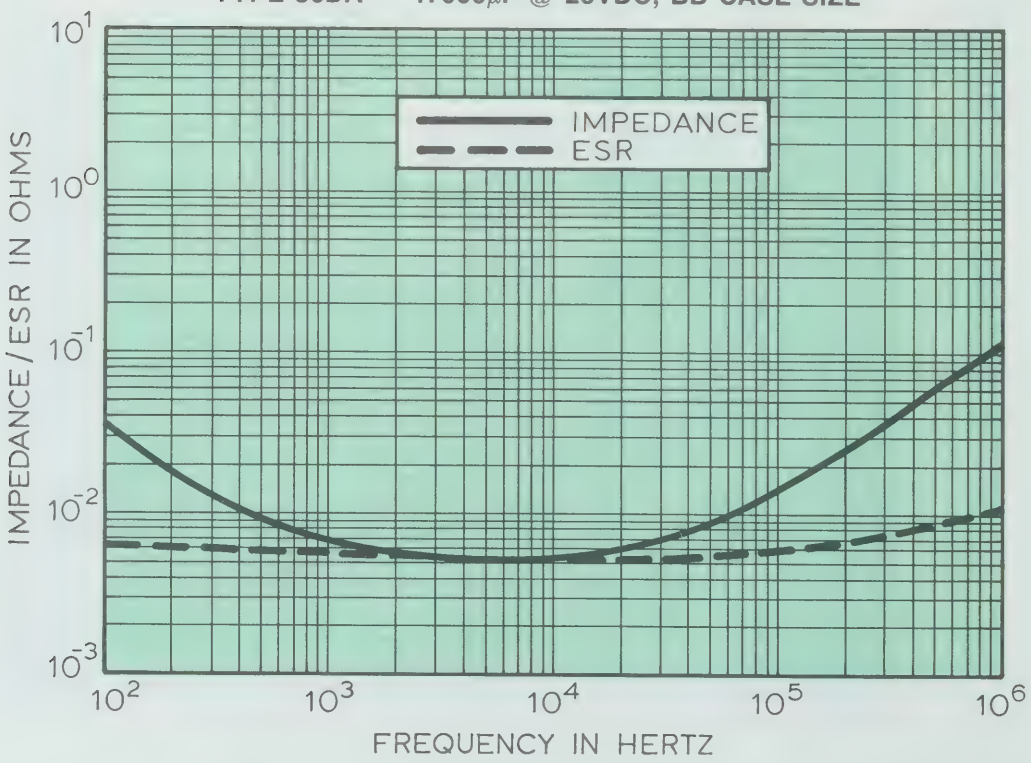
TYPICAL CURVES @ +25°C

TYPE 36DA — 220,000μF @ 6.3VDC, BB CASE SIZE



Dwg. No. A-14,642

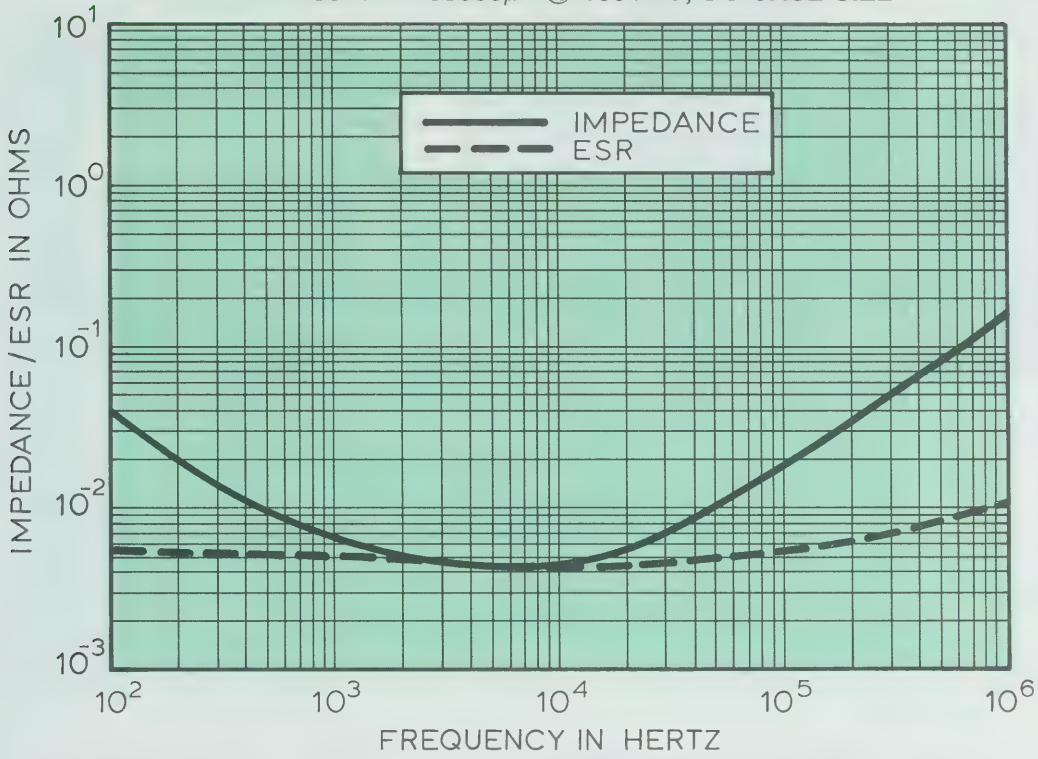
TYPE 36DA — 47000μF @ 25VDC, BB CASE SIZE



Dwg. No. A-14,641

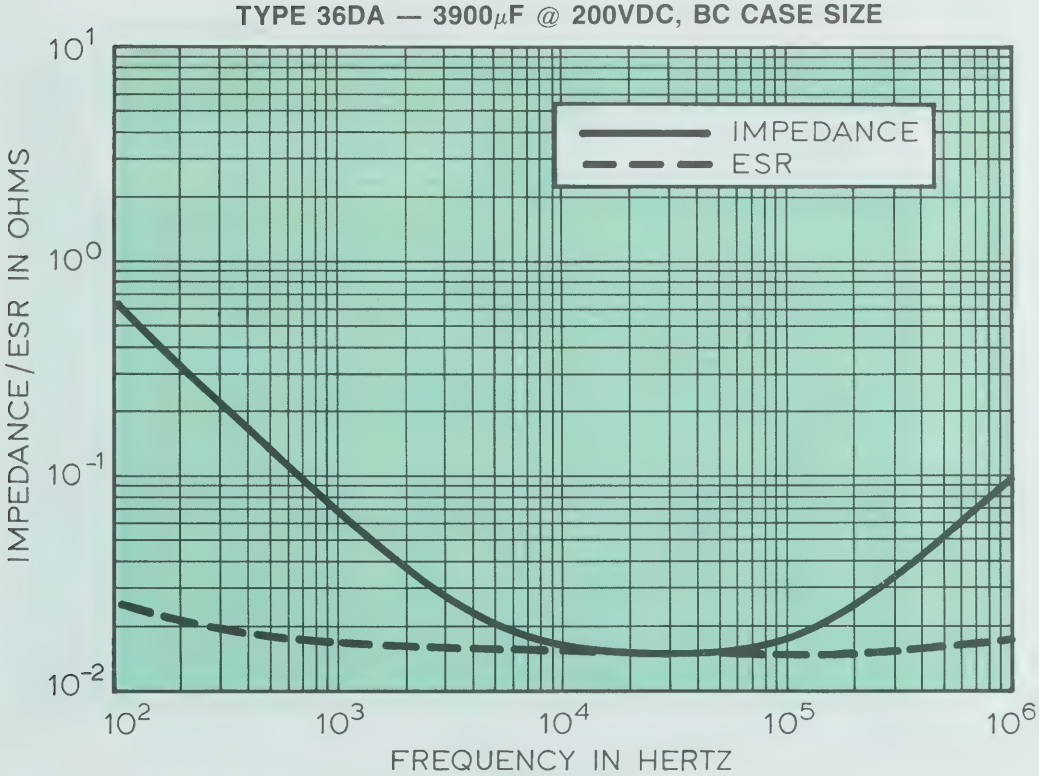
TYPICAL CURVES @ +25°C

TYPE 36DA — 33000μF @ 100VDC, DC CASE SIZE



Dwg. No. A-14,640

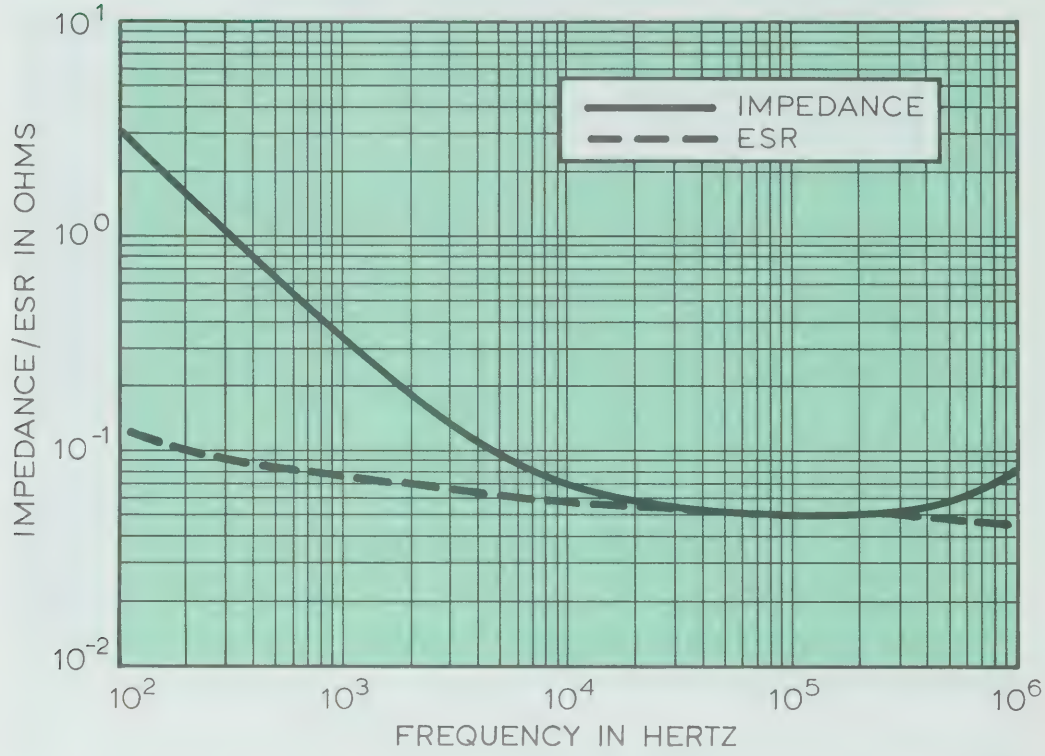
TYPE 36DA — 3900μF @ 200VDC, BC CASE SIZE



Dwg. No. A-14,639

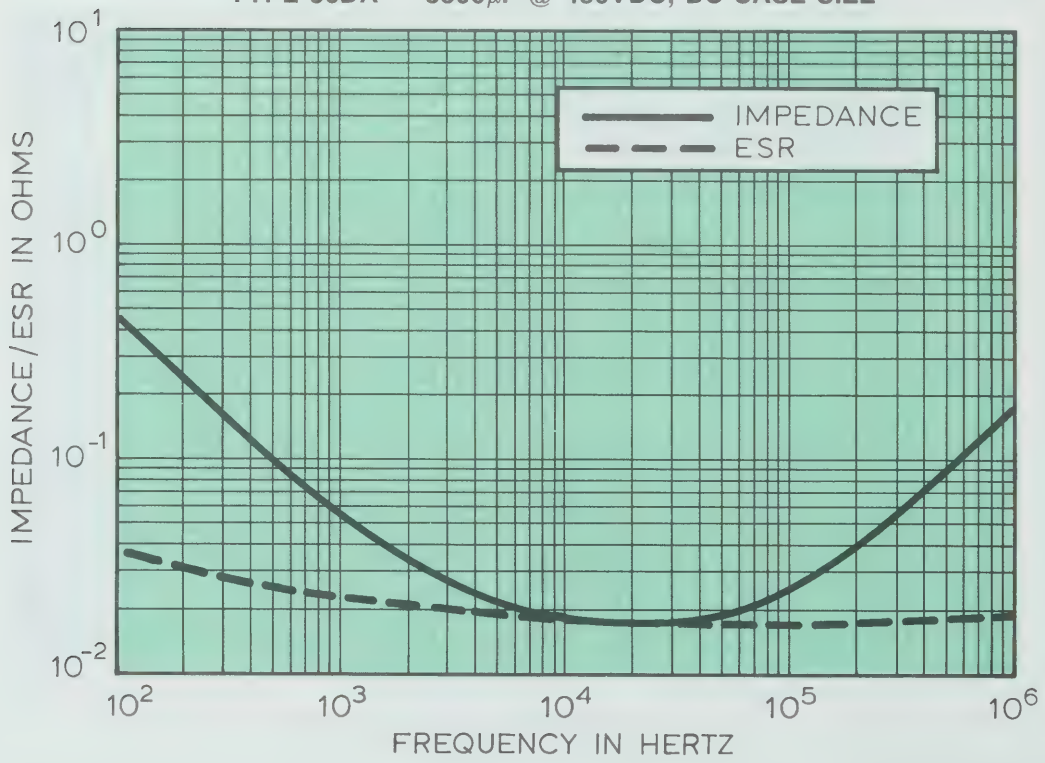
TYPICAL CURVES @ +25°C

TYPE 36DA — 680μF @ 350VDC, AL CASE SIZE



Dwg. No. A-14,638

TYPE 36DA — 3300μF @ 450VDC, DC CASE SIZE



Dwg. No. A-14,637

+85°C Large Can Aluminum Capacitors

L65-16

Features —

- **Ideal for High Wattage Power Supplies and Energy Storage Applications**
- **Capacitance Values to 2.2 Farads**
- **Metric Threads and Stud Mount Versions Included**

General Specifications —

Operating Temperature: –40°C to +85°C.

Voltage Range: 6.3 - 450 VDC.

Capacitance Range: 100μF - 2.2F.

Capacitance Tolerance: –10%, +50%.

Case Size Range: 1.375″ x 1.625″ - 3.0″ x 8.625″.

Termination: Screw inserts or solderable terminals.

Life Validation Test: 2000 hours at +85°C:
- Δ CAP ≤ 15% from initial measurement.
- Δ ESR ≤ 1.5x initial specified limit.
- Δ DCL ≤ initial specified limit.

Shelf Test: 500 hours at +85°C:
- Δ CAP ≤ 15% from initial measurement.
- Δ ESR ≤ 1.2x initial specified limit.
- Δ DCL ≤ 2x initial specified limit.

DC Leakage Current: 5 min. charge time.

$I = K\sqrt{CV}$

K = 4.0 at +25°C; 32.0 at +85°C.

C in μF, V in Volts, I in μA

Ripple Current Multipliers:

TEMPERATURE

Ambient Temperature	Multipliers
+85°C	1.0
+75°C	1.4
+65°C	1.7
+55°C & below	2.0

FREQUENCY Hz

Rated WVDC	120	400	1000 & Up
0-50	1.0	1.05	1.10
51-100	1.0	1.10	1.15
150-300	1.0	1.15	1.25
301-450	1.0	1.20	1.30

Performance Characteristics —

SEE PAGE 2.

Note: Type 36DY is not recommended for new design. See Type 36DA.

Catalog Numbering System

36DY 393 F 6R3 AN 2 A

LEAD CODE: A = LOW INSERT 10-32 SCREW THREAD (Standard)
B = HIGH INSERT 10-32 SCREW THREAD
D = HIGH CURRENT ¼-28 SCREW THREAD
N = LOW INSERT M5 SCREW THREAD
P = KEYED POLARITY VERTICAL MOUNT*
T = HIGH INSERT M5 SCREW THREAD

CASE STYLE: 2 = PVC INSULATING SLEEVE (Standard)
5 = PVC SLEEVE WITH RESIN END SEAL
(Optional only on P Lead Code) Required for exposure to halogenated cleaning solvents.

CASE CODE. SEE DIMENSIONS.

DC VOLTAGE RATING. EXPRESSED IN VOLTS. THE LETTER 'R' IS USED TO INDICATE A DECIMAL POINT.

CAPACITANCE TOLERANCE. F = −10%, +50%

CAPACITANCE. EXPRESSED IN MICROFARADS. THE FIRST TWO DIGITS ARE SIGNIFICANT FIGURES, THE THIRD IS THE NUMBER OF ZEROS.

TYPE NUMBER. IDENTIFIES THE BASIC CAPACITOR DESIGN.

*Available on 1.375″, 1.750″ and 2.000″ dia. units.

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size (inch) D x L	Max. ESR 120Hz, +25°C (mΩ)	Max. Ripple Current 120Hz, +85°C (A)
6.3 VOLTS DC WORKING; 8 VOLTS DC SURGE				
39,000	36DY393F6R3AN2A	1.375 x 1.625	50	4.27
68,000	36DY683F6R3AA2A	1.375 x 2.125	32	5.92
82,000	36DY823F6R3AM2A	1.375 x 2.625	24	7.39
120,000	36DY124F6R3AB2A	1.375 x 3.125	20	8.70
150,000	36DY154F6R3AL2A	1.375 x 3.625	17.0	9.96
180,000	36DY184F6R3AD2A	1.375 x 4.625	14.0	12.3
220,000	36DY224F6R3AE2A	1.375 x 5.125	13.0	13.3
82,000	36DY823F6R3BY2A	2.000 x 1.875	25	8.03
120,000	36DY124F6R3BA2A	2.000 x 2.125	19.5	9.52
180,000	36DY184F6R3BM2A	2.000 x 2.625	14.0	12.1
220,000	36DY224F6R3BB2A	2.000 x 3.125	11.2	14.4
270,000	36DY274F6R3BL2A	2.000 x 3.625	9.6	16.5
330,000	36DY334F6R3BC2A	2.000 x 4.125	8.5	18.5
390,000	36DY394F6R3BD2A	2.000 x 4.625	7.7	20.3
560,000	36DY564F6R3BF2A	2.000 x 5.625	6.6	23.8
390,000	36DY394F6R3CB2A	2.500 x 3.125	6.3	22.2
560,000	36DY564F6R3CC2A	2.500 x 4.125	5.0	27.6
680,000	36DY684F6R3CD2D	2.500 x 4.625	4.5	30.4
820,000	36DY824F6R3CF2D	2.500 x 5.625	4.1	34.4
680,000	36DY684F6R3DL2A	3.000 x 3.625	5.5	28.1
820,000	36DY824F6R3DC2D	3.000 x 4.125	4.9	31.2
1,000,000	36DY105F6R3DD2D	3.000 x 4.625	4.5	34.0
1,200,000	36DY125F6R3DE2D	3.000 x 5.125	4.3	36.2
2,200,000	36DY225F6R3DJ2D	3.000 x 8.625	3.4	50.0
10 VOLTS DC WORKING; 12 VOLTS DC SURGE				
27,000	36DY273F010AN2A	1.375 x 1.625	50	4.23
47,000	36DY473F010AA2A	1.375 x 2.125	32	5.86
68,000	36DY683F010AM2A	1.375 x 2.625	24	7.31
82,000	36DY823F010AB2A	1.375 x 3.125	19.8	8.65
100,000	36DY104F010AL2A	1.375 x 3.625	17.2	9.87
120,000	36DY124F010AC2A	1.375 x 4.125	15.2	11.1
150,000	36DY154F010AD2A	1.375 x 4.625	14.0	12.2
180,000	36DY184F010AF2A	1.375 x 5.625	12.0	14.3
68,000	36DY683F010BY2A	2.000 x 1.875	26	7.99
82,000	36DY823F010BA2A	2.000 x 2.125	19.7	9.47
120,000	36DY124F010BM2A	2.000 x 2.625	14.1	12.1
180,000	36DY184F010BB2A	2.000 x 3.125	11.2	14.4
220,000	36DY224F010BL2A	2.000 x 3.625	9.6	16.5
270,000	36DY274F010BC2A	2.000 x 4.125	8.6	18.4
390,000	36DY394F010BF2A	2.000 x 5.625	6.7	23.7
270,000	36DY274F010CB2A	2.500 x 3.125	6.4	21.9
470,000	36DY474F010CC2A	2.500 x 4.125	5.0	27.6
680,000	36DY684F010CF2D	2.500 x 5.625	4.2	34.0
560,000	36DY564F010DL2A	3.000 x 3.625	5.5	28.1
680,000	36DY684F010DC2D	3.000 x 4.125	5.0	30.9
820,000	36DY824F010DD2D	3.000 x 4.625	4.5	34.0
1,000,000	36DY105F010DF2D	3.000 x 5.625	4.1	38.4
1,500,000	36DY155F010DJ2D	3.000 x 8.625	3.4	50.0
16 VOLTS DC WORKING; 20 VOLTS DC SURGE				
18,000	36DY183F016AN2A	1.375 x 1.625	52	4.16
33,000	36DY333F016AA2A	1.375 x 2.125	33	5.77
47,000	36DY473F016AM2A	1.375 x 2.625	25	7.19
56,000	36DY563F016AB2A	1.375 x 3.125	20	8.55

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size (inch) D x L	Max. ESR 120Hz, +25°C (mΩ)	Max. Ripple Current 120Hz, +85°C (A)
16 VOLTS DC WORKING; 20 VOLTS DC SURGE (Cont.)				
68,000	36DY683F016AL2A	1.375 x 3.625	17.5	9.79
82,000	36DY823F016AC2A	1.375 x 4.125	15.7	10.9
100,000	36DY104F016AD2A	1.375 x 4.625	14.2	12.1
120,000	36DY124F016AF2A	1.375 x 5.625	12.5	14.0
39,000	36DY393F016BY2A	2.000 x 1.875	26	7.92
56,000	36DY563F016BA2A	2.000 x 2.125	20	9.40
82,000	36DY823F016BM2A	2.000 x 2.625	14.3	12.0
100,000	36DY104F016BB2A	2.000 x 3.125	11.6	14.2
120,000	36DY124F016BL2A	2.000 x 3.625	9.8	16.3
150,000	36DY154F016BC2A	2.000 x 4.125	8.7	18.3
180,000	36DY184F016BD2A	2.000 x 4.625	7.9	20.0
220,000	36DY224F016BF2A	2.000 x 5.625	6.7	23.6
180,000	36DY184F016CB2A	2.500 x 3.125	6.6	21.7
270,000	36DY274F016CC2A	2.500 x 4.125	5.1	27.3
330,000	36DY334F016CD2A	2.500 x 4.625	4.8	29.4
470,000	36DY474F016CF2D	2.500 x 5.625	4.2	34.0
390,000	36DY394F016DL2A	3.000 x 3.625	5.5	28.1
470,000	36DY474F016DC2D	3.000 x 4.125	5.0	30.9
560,000	36DY564F016DE2D	3.000 x 5.125	4.3	36.2
680,000	36DY684F016DF2D	3.000 x 5.625	4.1	38.4
1,000,000	36DY105F016DJ2D	3.000 x 8.625	3.4	50.0
25 VOLTS DC WORKING; 30 VOLTS DC SURGE				
6,800	36DY682F025AN2A	1.375 x 1.625	54	4.08
12,000	36DY123F025AA2A	1.375 x 2.125	35	5.61
18,000	36DY183F025AM2A	1.375 x 2.625	25	7.12
22,000	36DY223F025AB2A	1.375 x 3.125	21	8.42
27,000	36DY273F025AL2A	1.375 x 3.625	18.0	9.65
33,000	36DY333F025AC2A	1.375 x 4.125	15.9	10.9
39,000	36DY393F025AD2A	1.375 x 4.625	14.6	11.9
47,000	36DY473F025AF2A	1.375 x 5.625	12.6	14.0
15,000	36DY153F025BY2A	2.000 x 1.875	28	7.59
22,000	36DY223F025BA2A	2.000 x 2.125	21	9.29
33,000	36DY333F025BM2A	2.000 x 2.625	15.4	11.5
47,000	36DY473F025BB2A	2.000 x 3.125	12.3	13.8
56,000	36DY563F025BL2A	2.000 x 3.625	10.4	15.9
68,000	36DY683F025BC2A	2.000 x 4.125	9.1	17.9
82,000	36DY823F025BD2A	2.000 x 4.625	8.3	19.6
100,000	36DY104F025BF2A	2.000 x 5.625	7.2	22.8
82,000	36DY823F025CB2A	2.500 x 3.125	8.9	18.6
120,000	36DY124F025CC2A	2.500 x 4.125	6.7	23.8
180,000	36DY184F025CF2D	2.500 x 5.625	5.2	30.6
150,000	36DY154F025DL2A	3.000 x 3.625	5.8	27.4
180,000	36DY184F025DC2D	3.000 x 4.125	5.2	30.3
220,000	36DY224F025DE2D	3.000 x 5.125	4.5	35.3
270,000	36DY274F025DF2D	3.000 x 5.625	4.3	37.5
390,000	36DY394F025DJ2D	3.000 x 8.625	3.5	49.5
40 VOLTS DC WORKING; 50 VOLTS DC SURGE				
4,700	36DY472F040AN2A	1.375 x 1.625	59	3.89
6,800	36DY682F040AA2A	1.375 x 2.125	37	5.42
10,000	36DY103F040AM2A	1.375 x 2.625	28	6.84
12,000	36DY123F040AB2A	1.375 x 3.125	23	8.10
15,000	36DY153F040AL2A	1.375 x 3.625	19.4	9.30
18,000	36DY183F040AC2A	1.375 x 4.125	17.2	10.4
22,000	36DY223F040AD2A	1.375 x 4.625	15.5	11.5
27,000	36DY273F040AE2A	1.375 x 5.125	14.2	12.6

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size (inch) D x L	Max. ESR 120Hz, +25°C (mΩ)	Max. Ripple Current 120Hz, +85°C (A)
40 VOLTS DC WORKING; 50 VOLTS DC SURGE (Cont.)				
10,000	36DY103F040BY2A	2.000 x 1.875	30	7.40
12,000	36DY123F040BA2A	2.000 x 2.125	23	8.84
18,000	36DY183F040BM2A	2.000 x 2.625	16.2	11.3
27,000	36DY273F040BB2A	2.000 x 3.125	12.8	13.5
33,000	36DY333F040BL2A	2.000 x 3.625	10.9	15.5
39,000	36DY393F040BC2A	2.000 x 4.125	9.6	17.4
47,000	36DY473F040BD2A	2.000 x 4.625	8.7	19.1
56,000	36DY563F040BF2A	2.000 x 5.625	7.4	22.5
47,000	36DY473F040CB2A	2.500 x 3.125	9.1	18.4
68,000	36DY683F040CC2A	2.500 x 4.125	7.0	23.3
82,000	36DY823F040CD2A	2.500 x 4.625	6.3	25.7
100,000	36DY104F040CF2D	2.500 x 5.625	5.4	30.0
82,000	36DY823F040DL2A	3.000 x 3.625	6.0	26.9
100,000	36DY104F040DC2A	3.000 x 4.125	5.4	29.7
120,000	36DY124F040DD2D	3.000 x 4.625	5.0	32.2
150,000	36DY154F040DF2D	3.000 x 5.625	4.4	37.1
270,000	36DY274F040DJ2D	3.000 x 8.625	3.6	48.8
50 VOLTS DC WORKING; 65 VOLTS DC SURGE				
3,300	36DY332F050AN2A	1.375 x 1.625	64	3.75
5,600	36DY562F050AA2A	1.375 x 2.125	40	5.25
8,200	36DY822F050AM2A	1.375 x 2.625	29	6.66
10,000	36DY103F050AB2A	1.375 x 3.125	24	7.79
12,000	36DY123F050AL2A	1.375 x 3.625	20	9.07
15,000	36DY153F050AC2A	1.375 x 4.125	18.2	10.1
18,000	36DY183F050AD2A	1.375 x 4.625	16.3	11.3
20,000	36DY203F050AE2A	1.375 x 5.125	15.0	12.3
22,000	36DY223F050AF2A	1.375 x 5.625	14.0	13.2
8,200	36DY822F050BY2A	2.000 x 1.875	31	7.23
10,000	36DY103F050BA2A	2.000 x 2.125	24	8.60
15,000	36DY153F050BM2A	2.000 x 2.625	16.9	11.0
18,000	36DY183F050BB2A	2.000 x 3.125	13.3	13.2
27,000	36DY273F050BL2A	2.000 x 3.625	11.2	15.3
36,000	36DY363F050BD2A	2.000 x 4.625	8.9	18.9
47,000	36DY473F050BF2A	2.000 x 5.625	7.7	22.1
33,000	36DY333F050CB2A	2.500 x 3.125	9.5	18.1
56,000	36DY563F050CC2A	2.500 x 4.125	7.1	23.1
82,000	36DY823F050CF2A	2.500 x 5.625	5.9	29.5
68,000	36DY683F050DL2A	3.000 x 3.625	6.2	26.5
82,000	36DY823F050DC2A	3.000 x 4.125	5.6	29.2
100,000	36DY104F050DE2D	3.000 x 5.125	4.8	34.2
120,000	36DY124F050DF2D	3.000 x 5.625	4.5	36.7
180,000	36DY184F050DJ2D	3.000 x 8.625	3.6	48.8
63 VOLTS DC WORKING; 75 VOLTS DC SURGE				
2,700	36DY272F063AN2A	1.375 x 1.625	69	3.62
4,700	36DY472F063AA2A	1.375 x 2.125	42	5.10
6,800	36DY682F063AM2A	1.375 x 2.625	31	6.47
8,200	36DY822F063AB2A	1.375 x 3.125	25	7.72
10,000	36DY103F063AL2A	1.375 x 3.625	22	8.75
12,000	36DY123F063AC2A	1.375 x 4.125	19.2	9.87

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size (inch) D x L	Max. ESR 120Hz, +25°C (mΩ)	Max. Ripple Current 120Hz, +85°C (A)
63 VOLTS DC WORKING; 75 VOLTS DC SURGE (Cont.)				
15,000	36DY153F063AE2A	1.375 x 5.125	15.7	12.0
18,000	36DY183F063AF2A	1.375 x 5.625	14.6	13.0
5,600	36DY562F063BY2A	2.000 x 1.875	32	7.08
8,200	36DY822F063BA2A	2.000 x 2.125	25	8.42
12,000	36DY123F063BM2A	2.000 x 2.625	17.4	10.9
15,000	36DY153F063BB2A	2.000 x 3.125	13.9	13.0
22,000	36DY223F063BL2A	2.000 x 3.625	11.7	15.0
27,000	36DY273F063BD2A	2.000 x 4.625	9.1	18.7
39,000	36DY393F063BF2A	2.000 x 5.625	7.8	21.9
27,000	36DY273F063CB2A	2.500 x 3.125	9.7	17.9
39,000	36DY393F063CC2A	2.500 x 4.125	7.3	22.8
47,000	36DY473F063CD2A	2.500 x 4.625	6.6	25.1
68,000	36DY683F063CF2A	2.500 x 5.625	5.7	29.2
56,000	36DY563F063DL2A	3.000 x 3.625	6.3	26.3
68,000	36DY683F063DD2D	3.000 x 4.625	5.2	31.6
82,000	36DY823F063DE2D	3.000 x 5.125	4.9	33.9
100,000	36DY104F063DF2D	3.000 x 5.625	4.5	36.7
150,000	36DY154F060DJ2D	3.000 x 8.625	3.7	48.2
100 VOLTS DC WORKING; 125 VOLTS DC SURGE				
1,000	36DY102F100AN2A	1.375 x 1.625	131	2.61
1,500	36DY152F100AA2A	1.375 x 2.125	79	3.73
1,800	36DY182F100AM2A	1.375 x 2.625	56	4.82
2,700	36DY272F100AB2A	1.375 x 3.125	44	5.79
3,900	36DY392F100AL2A	1.375 x 3.625	37	6.78
4,700	36DY472F100AC2A	1.375 x 4.125	32	7.68
5,600	36DY562F100AE2A	1.375 x 5.125	25	9.43
6,800	36DY682F100AF2A	1.375 x 5.625	23	10.3
2,200	36DY222F100BY2A	2.000 x 1.875	59	5.27
2,700	36DY272F100BA2A	2.000 x 2.125	46	6.19
4,700	36DY472F100BM2A	2.000 x 2.625	30	8.29
5,600	36DY562F100BB2A	2.000 x 3.125	23	10.0
8,200	36DY822F100BL2A	2.000 x 3.625	18.9	11.8
10,000	36DY103F100BC2A	2.000 x 4.125	16.3	13.3
12,000	36DY123F100BF2A	2.000 x 5.625	12.3	17.5
10,000	36DY103F100CB2A	2.500 x 3.125	14.8	14.5
15,000	36DY153F100CC2A	2.500 x 4.125	10.4	19.1
18,000	36DY183F100CD2A	2.500 x 4.625	9.5	20.9
22,000	36DY223F100CF2A	2.500 x 5.625	7.8	25.0
18,000	36DY183F100DL2A	3.000 x 3.625	11.2	19.7
22,000	36DY223F100DC2A	3.000 x 4.125	9.7	22.2
27,000	36DY273F100DD2A	3.000 x 4.625	8.7	24.4
33,000	36DY333F100DE2A	3.000 x 5.125	7.9	26.7
56,000	36DY563F100DJ2D	3.000 x 8.625	5.4	39.9
150 VOLTS DC WORKING; 175 VOLTS DC SURGE				
390	36DY391F150AN2A	1.375 x 1.625	245	1.56
680	36DY681F150AA2A	1.375 x 2.125	141	2.27
1,000	36DY102F150AM2A	1.375 x 2.625	96	2.99
1,200	36DY122F150AB2A	1.375 x 3.125	80	3.51
1,500	36DY152F150AL2A	1.375 x 3.625	64	4.18
1,800	36DY182F150AC2A	1.375 x 4.125	53	4.85
2,200	36DY222F150AE2A	1.375 x 5.125	43	5.92
2,700	36DY272F150AF2A	1.375 x 5.625	35	6.84

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size (inch) D x L	Max. ESR 120Hz, +25°C (mΩ)	Max. Ripple Current 120Hz, +85°C (A)
150 VOLTS DC WORKING; 175 VOLTS DC SURGE (Cont.)				
820	36DY821F150BY2A	2.000 x 1.875	153	2.66
1,200	36DY122F150BA2A	2.000 x 2.125	104	3.37
1,800	36DY182F150BM2A	2.000 x 2.625	70	4.42
2,200	36DY222F150BB2A	2.000 x 3.125	57	5.22
2,700	36DY272F150BL2A	2.000 x 3.625	46	6.16
3,300	36DY332F150BC2A	2.000 x 4.125	38	7.13
3,900	36DY392F150BD2A	2.000 x 4.625	32	8.14
5,600	36DY562F150BF2A	2.000 x 5.625	22	10.66
3,900	36DY392F150CB2A	2.500 x 3.125	31	8.16
5,600	36DY562F150CC2A	2.500 x 4.125	22	10.73
10,000	36DY103F150CF2A	2.500 x 5.625	12	16.43
8,200	36DY822F150DL2A	3.000 x 3.625	20	12.04
10,000	36DY103F150DC2A	3.000 x 4.125	17	13.68
12,000	36DY123F150DE2A	3.000 x 5.125	14	16.36
22,000	36DY223F150DJ2A	3.000 x 8.625	8	26.75
200 VOLTS DC WORKING; 250 VOLTS DC SURGE				
330	36DY331F200AN2A	1.375 x 1.625	254	1.54
560	36DY561F200AA2A	1.375 x 2.125	150	2.20
820	36DY821F200AM2A	1.375 x 2.625	102	2.90
1,000	36DY102F200AB2A	1.375 x 3.125	84	3.43
1,200	36DY122F200AL2A	1.375 x 3.625	70	4.00
1,500	36DY152F200AC2A	1.375 x 4.125	56	4.72
1,800	36DY182F200AE2A	1.375 x 5.125	47	5.66
2,200	36DY222F200AF2A	1.375 x 5.625	38	6.56
680	36DY681F200BY2A	2.000 x 1.875	158	2.62
1,000	36DY102F200BA2A	2.000 x 2.125	108	3.30
1,500	36DY152F200BM2A	2.000 x 2.625	72	4.36
1,800	36DY182F200BB2A	2.000 x 3.125	60	5.09
2,200	36DY222F200BL2A	2.000 x 3.625	49	5.97
2,700	36DY272F200BC2A	2.000 x 4.125	40	6.95
3,300	36DY332F200BD2A	2.000 x 4.625	33	8.02
4,700	36DY472F200BF2A	2.000 x 5.625	23	10.42
3,300	36DY332F200CB2A	2.500 x 3.125	32	8.03
4,700	36DY472F200CC2A	2.500 x 4.125	22	10.73
5,600	36DY562F200CD2A	2.500 x 4.625	19	12.07
8,200	36DY822F200CF2A	2.500 x 5.625	13	15.79
6,800	36DY682F200DL2A	3.000 x 3.625	20	12.04
8,200	36DY822F200DD2A	3.000 x 4.625	17	14.27
10,000	36DY103F200DE2A	3.000 x 5.125	14	16.36
12,000	36DY123F200DF2A	3.000 x 5.625	11	19.14
18,000	36DY183F200DJ2A	3.000 x 8.625	8	26.75
250 VOLTS DC WORKING; 300 VOLTS DC SURGE				
270	36DY271F250AN2A	1.375 x 1.625	275	1.48
470	36DY471F250AA2A	1.375 x 2.125	158	2.15
560	36DY561F250AM2A	1.375 x 2.625	132	2.55
820	36DY821F250AB2A	1.375 x 3.125	90	3.31
1,000	36DY102F250AL2A	1.375 x 3.625	74	3.89
1,200	36DY122F250AC2A	1.375 x 4.125	62	4.49
1,500	36DY152F250AE2A	1.375 x 5.125	49	5.54
1,800	36DY182F250AF2A	1.375 x 5.625	41	6.32

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size (inch) D x L	Max. ESR 120Hz, +25°C (mΩ)	Max. Ripple Current 120Hz, +85°C (A)
250 VOLTS DC WORKING; 300 VOLTS DC SURGE (Cont.)				
560	36DY561F250BY2A	2.000 x 1.875	165	2.56
820	36DY821F250BA2A	2.000 x 2.125	113	3.23
1,200	36DY122F250BM2A	2.000 x 2.625	77	4.21
1,500	36DY152F250BB2A	2.000 x 3.125	62	5.01
1,800	36DY182F250BL2A	2.000 x 3.625	51	5.85
2,200	36DY222F250BC2A	2.000 x 4.125	42	6.78
2,700	36DY272F250BD2A	2.000 x 4.625	34	7.90
3,300	36DY332F250BF2A	2.000 x 5.625	29	9.44
2,700	36DY272F250CB2A	2.500 x 3.125	34	7.79
3,900	36DY392F250CC2A	2.500 x 4.125	23	10.49
4,700	36DY472F250CD2A	2.500 x 4.625	19	12.07
5,600	36DY562F250CF2A	2.500 x 5.625	16	14.23
4,700	36DY472F250DL2A	3.000 x 3.625	24	10.99
5,600	36DY562F250DC2A	3.000 x 4.125	20	12.61
6,800	36DY682F250DD2A	3.000 x 4.625	17	14.27
8,200	36DY822F250DE2A	3.000 x 5.125	14	16.35
10,000	36DY103F250DF2A	3.000 x 5.625	11	19.14
15,000	36DY153F250DJ2A	3.000 x 8.625	8	26.75
350 VOLTS DC WORKING; 400 VOLTS DC SURGE				
150	36DY151F350AN2A	1.375 x 1.625	853	0.84
220	36DY221F350AA2A	1.375 x 2.125	681	1.12
330	36DY331F350AM2A	1.375 x 2.625	388	1.49
470	36DY471F350AB2A	1.375 x 3.125	272	1.91
560	36DY561F350AL2A	1.375 x 3.625	228	2.21
680	36DY681F350AC2A	1.375 x 4.125	188	2.58
820	36DY821F350AE2A	1.375 x 5.125	156	3.11
1,000	36DY102F350AF2A	1.375 x 5.625	128	3.58
330	36DY331F350BY2A	2.000 x 1.875	412	1.62
470	36DY471F350BA2A	2.000 x 2.125	289	2.02
680	36DY681F350BM2A	2.000 x 2.625	200	2.61
820	36DY821F350BB2A	2.000 x 3.125	166	3.06
1,000	36DY102F350BL2A	2.000 x 3.625	136	3.58
1,200	36DY122F350BC2A	2.000 x 4.125	113	4.13
1,500	36DY152F350BD2A	2.000 x 4.625	91	4.83
1,800	36DY182F350BF2A	2.000 x 5.625	76	5.73
1,500	36DY152F350CB2A	2.500 x 3.125	90	4.79
2,200	36DY222F350CC2A	2.500 x 4.125	61	6.44
2,700	36DY272F350CD2A	2.500 x 4.625	50	7.44
3,300	36DY332F350CF2A	2.500 x 5.625	41	8.89
2,700	36DY272F350DL2A	3.000 x 3.625	53	7.39
3,300	36DY332F350DC2A	3.000 x 4.125	44	8.50
3,900	36DY392F350DD2A	3.000 x 4.625	37	9.68
4,700	36DY472F350DE2A	3.000 x 5.125	31	10.99
8,200	36DY822F350DJ2A	3.000 x 8.625	18	17.83
400 VOLTS DC WORKING; 450 VOLTS DC SURGE				
120	36DY121F400AN2A	1.375 x 1.625	964	0.79
180	36DY181F400AA2A	1.375 x 2.125	643	1.06
270	36DY271F400AM2A	1.375 x 2.625	429	1.41
330	36DY331F400AB2A	1.375 x 3.125	351	1.68
470	36DY471F400AL2A	1.375 x 3.625	246	2.13
560	36DY561F400AC2A	1.375 x 4.125	207	2.58
680	36DY681F400AE2A	1.375 x 5.125	170	2.98
820	36DY821F400AF2A	1.375 x 5.625	141	3.41

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size (inch) D x L	Max. ESR 120Hz, +25°C (mΩ)	Max. Ripple Current 120Hz, +85°C (A)
400 VOLTS DC WORKING; 450 VOLTS DC SURGE (Cont.)				
270	36DY271F400BY2A	2.000 x 1.875	466	1.54
330	36DY331F400BA2A	2.000 x 2.125	372	1.78
560	36DY561F400BM2A	2.000 x 2.625	219	2.50
680	36DY681F400BB2A	2.000 x 3.125	181	2.93
820	36DY821F400BL2A	2.000 x 3.625	150	3.41
1,000	36DY102F400BC2A	2.000 x 4.125	123	3.96
1,200	36DY122F400BD2A	2.000 x 4.625	102	4.56
1,500	36DY152F400BF2A	2.000 x 5.625	82	5.52
1,200	36DY122F400CB2A	2.500 x 3.125	101	4.52
1,800	36DY182F400CC2A	2.500 x 4.125	67	5.15
2,200	36DY222F400CD2A	2.500 x 4.625	55	7.09
2,700	36DY272F400CF2A	2.500 x 5.625	45	8.48
2,200	36DY222F400DL2A	3.000 x 3.625	59	7.01
2,700	36DY272F400DC2A	3.000 x 4.125	48	8.14
3,300	36DY332F400DD2A	3.000 x 4.625	39	9.42
3,900	36DY392F400DE2A	3.000 x 5.125	33	10.66
6,800	36DY682F400DJ2A	3.000 x 8.625	19	17.36
450 VOLTS DC WORKING; 525 VOLTS DC SURGE				
100	36DY101F450AN2A	1.375 x 1.625	1048	0.76
180	36DY181F450AA2A	1.375 x 2.125	582	1.12
270	36DY271F450AM2A	1.375 x 2.625	388	1.45
330	36DY331F450AB2A	1.375 x 3.125	317	1.77
390	36DY391F450AL2A	1.375 x 3.625	269	2.04
470	36DY471F450AC2A	1.375 x 4.125	223	2.37
560	36DY561F450AE2A	1.375 x 5.125	187	2.71
680	36DY681F450AF2A	1.375 x 5.625	164	3.13
270	36DY271F450BY2A	2.000 x 1.875	419	1.61
330	36DY331F450BA2A	2.000 x 2.125	343	1.85
470	36DY471F450BM2A	2.000 x 2.625	241	2.38
680	36DY681F450BB2A	2.000 x 3.125	166	3.06
820	36DY821F450BL2A	2.000 x 3.625	138	3.55
1,000	36DY102F450BC2A	2.000 x 4.125	113	4.13
1,200	36DY122F450BD2A	2.000 x 4.625	94	4.75
1,500	36DY152F450BF2A	2.000 x 5.625	75	5.77
1,200	36DY122F450CB2A	2.500 x 3.125	93	4.71
1,800	36DY182F450CC2A	2.500 x 4.125	62	6.39
2,700	36DY272F450CF2A	2.500 x 5.625	42	8.78
2,200	36DY222F450DL2A	3.000 x 3.625	54	7.33
2,700	36DY272F450DC2A	3.000 x 4.125	44	8.50
3,300	36DY332F450DD2A	3.000 x 4.625	36	10.20
3,900	36DY392F450DE2A	3.000 x 5.125	30	11.59
5,600	36DY562F450DJ2A	3.000 x 8.625	21	16.51

+105°C Large Can Aluminum Capacitors

L65-20

Features —

- Long Life and Stability
- High Ripple Current Capability
- Metric, Stud Mount and Plug-In Styles Available
- Extended Temperature Range

General Specifications —

Operating Temperature: –40°C to +105°C.

Voltage Range: 6.3 - 450 VDC.

Capacitance Range: 100μF - 470,000μF.

Capacitance Tolerance: –10%, +50%.

Case Size Range: 1.375″ x 1.625″ - 2.000″ x 5.625″.

Termination: Screw insert or solderable terminals.

Life Validation Test: 2000 hours at +105°C:
- Δ CAP ≤ 20% from initial measurement.
- Δ ESR ≤ 1.5x initial specified limit.
- Δ DCL ≤ initial specified limit.

Shelf Test: 1000 hours at +105°C:
- Δ CAP ≤ 15% from initial measurement.
- Δ ESR ≤ 1.3x initial specified limit.
- Δ DCL ≤ 2x initial specified limit.

DC Leakage Current: 5 min. charge time.

$I = K\sqrt{CV}$

K = 4.0 at +25°C; 12.0 at +105°C.

I in μA, C in μF, V in Volts

Ripple Current Multipliers:

TEMPERATURE

Ambient Temperature	Multipliers
+105°C	0.5
+85°C	1.0
+75°C	1.4
+65°C	1.7
+55°C & below	2.0

FREQUENCY Hz

Rated WVDC	120	400	1000 & Up
0-50	1.0	1.05	1.10
51-100	1.0	1.10	1.15
150-300	1.0	1.15	1.25
301-450	1.0	1.20	1.30

Performance Characteristics —

SEE PAGE 2.

Catalog Numbering System

777D 333 F 6R3 AN 2 A

LEAD CODE: A = LOW INSERT 10-32 SCREW THREAD (Standard)
B = HIGH INSERT 10-32 SCREW THREAD
N = LOW INSERT M5 SCREW THREAD
P = KEYED POLARITY VERTICAL MOUNT
T = HIGH INSERT M5 SCREW THREAD

CASE STYLE: 2 = PVC INSULATING SLEEVE (Standard)
5 = PVC SLEEVE WITH RESIN END SEAL
(Optional only on P Lead Code) Required for exposure to halogenated cleaning solvents.

CASE CODE. SEE DIMENSIONS, PAGE 168.

DC VOLTAGE RATING. EXPRESSED IN VOLTS. THE LETTER 'R' IS USED TO INDICATE A DECIMAL POINT. FOR EXAMPLE, 6R3 = 6.3 VOLTS.

CAPACITANCE TOLERANCE. F = −10%, +50%

CAPACITANCE. EXPRESSED IN MICROFARADS. THE FIRST TWO DIGITS ARE SIGNIFICANT FIGURES, THE THIRD IS THE NUMBER OF ZEROS.

TYPE NUMBER. IDENTIFIES THE BASIC CAPACITOR DESIGN.

STANDARD RATINGS

µF	Catalog Number	Nominal Case Size (inch) D x L	Max. ESR 120Hz, +25°C (mΩ)	Max. Ripple Current 120Hz, +85°C (A)
6.3 VOLTS DC WORKING; 8 VOLTS DC SURGE				
33,000	777D333F6R3AN2A	1.375 x 1.625	77.0	3.94
47,000	777D473F6R3AY2A	1.375 x 1.875	58.5	4.76
56,000	777D563F6R3AA2A	1.375 x 2.125	47.6	5.53
82,000	777D823F6R3AM2A	1.375 x 2.625	35.3	6.97
100,000	777D104F6R3AB2A	1.375 x 3.125	28.6	8.31
120,000	777D124F6R3AL2A	1.375 x 3.625	24.3	9.58
150,000	777D154F6R3AC2A	1.375 x 4.125	21.4	10.80
180,000	777D184F6R3AE2A	1.375 x 5.125	17.6	13.00
220,000	777D224F6R3AF2A	1.375 x 5.625	16.3	14.10
68,000	777D683F6R3BY2A	2.000 x 1.875	36.1	7.75
100,000	777D104F6R3BA2A	2.000 x 2.125	27.5	9.26
150,000	777D154F6R3BM2A	2.000 x 2.625	19.0	11.90
180,000	777D184F6R3BB2A	2.000 x 3.125	14.9	14.40
220,000	777D224F6R3BL2A	2.000 x 3.625	12.4	16.70
270,000	777D274F6R3BC2A	2.000 x 4.125	10.8	18.90
330,000	777D334F6R3BD2A	2.000 x 4.625	9.6	21.00
390,000	777D394F6R3BE2A	2.000 x 5.125	8.7	22.90
470,000	777D474F6R3BF2A	2.000 x 5.625	8.1	24.80
10 VOLTS DC WORKING; 12 VOLTS DC SURGE				
22,000	777D223F010AN2A	1.375 x 1.625	78.4	3.91
33,000	777D333F010AY2A	1.375 x 1.875	59.5	4.72
39,000	777D393F010AA2A	1.375 x 2.125	48.4	5.48
56,000	777D563F010AM2A	1.375 x 2.625	35.9	6.91
68,000	777D683F010AB2A	1.375 x 3.125	29.0	8.25
82,000	777D823F010AL2A	1.375 x 3.625	24.7	9.51
100,000	777D104F010AC2A	1.375 x 4.125	21.7	10.70
120,000	777D124F010AD2A	1.375 x 4.625	19.5	11.80
150,000	777D154F010AE2A	1.375 x 5.125	17.8	13.00
56,000	777D563F010BY2A	2.000 x 1.875	36.7	7.68
68,000	777D683F010BA2A	2.000 x 2.125	27.9	9.18
120,000	777D124F010BM2A	2.000 x 2.625	19.3	11.80
150,000	777D154F010BB2A	2.000 x 3.125	15.1	14.30
180,000	777D184F010BL2A	2.000 x 3.625	12.6	16.60
220,000	777D224F010BC2A	2.000 x 4.125	10.9	18.80
270,000	777D274F010BD2A	2.000 x 4.625	9.7	20.80
330,000	777D334F010BF2A	2.000 x 5.625	8.2	24.70
16 VOLTS DC WORKING; 20 VOLTS DC SURGE				
12,000	777D123F016AN2A	1.375 x 1.625	84.5	3.76
18,000	777D183F016AY2A	1.375 x 1.875	64.1	4.55
22,000	777D223F016AA2A	1.375 x 2.125	52.1	5.29
33,000	777D333F016AM2A	1.375 x 2.625	38.5	6.67
39,000	777D393F016AB2A	1.375 x 3.125	31.0	7.98
47,000	777D473F016AL2A	1.375 x 3.625	26.3	9.21
56,000	777D563F016AC2A	1.375 x 4.125	23.1	10.40
68,000	777D683F016AD2A	1.375 x 4.625	20.7	11.50
82,000	777D823F016AE2A	1.375 x 5.125	18.9	12.60
27,000	777D273F016BY2A	2.000 x 1.875	41.2	7.25
39,000	777D393F016BA2A	2.000 x 2.125	31.2	8.68
56,000	777D563F016BM2A	2.000 x 2.625	21.5	11.20
82,000	777D823F016BB2A	2.000 x 3.125	16.7	13.60
100,000	777D104F016BL2A	2.000 x 3.625	13.9	15.80
120,000	777D124F016BC2A	2.000 x 4.125	12.0	17.90
150,000	777D154F016BD2A	2.000 x 4.625	10.7	19.90
180,000	777D184F016BF2A	2.000 x 5.625	8.9	23.70

STANDARD RATINGS

µF	Catalog Number	Nominal Case Size (inch) D x L	Max. ESR 120Hz, +25°C (mΩ)	Max. Ripple Current 120Hz, +85°C (A)
25 VOLTS DC WORKING; 30 VOLTS DC SURGE				
6,800	777D682F025AN2A	1.375 x 1.625	86.9	3.71
10,000	777D103F025AY2A	1.375 x 1.875	65.9	4.49
12,000	777D123F025AA2A	1.375 x 2.125	53.5	5.22
18,000	777D183F025AM2A	1.375 x 2.625	39.5	6.59
22,000	777D223F025AB2A	1.375 x 3.125	31.8	7.88
27,000	777D273F025AL2A	1.375 x 3.625	26.9	9.11
33,000	777D333F025AC2A	1.375 x 4.125	23.6	10.20
39,000	777D393F025AD2A	1.375 x 4.625	21.1	11.40
47,000	777D473F025AF2A	1.375 x 5.625	17.8	13.50
18,000	777D183F025BY2A	2.000 x 1.875	42.1	7.17
22,000	777D223F025BA2A	2.000 x 2.125	32.0	8.58
33,000	777D333F025BM2A	2.000 x 2.625	22.0	11.14
47,000	777D473F025BB2A	2.000 x 3.125	17.1	13.49
56,000	777D563F025BL2A	2.000 x 3.625	14.2	15.68
68,000	777D683F025BC2A	2.000 x 4.125	12.2	17.76
82,000	777D823F025BE2A	2.000 x 5.125	9.8	21.67
100,000	777D104F025BF2A	2.000 x 5.625	9.0	23.51
35 VOLTS DC WORKING; 45 VOLTS DC SURGE				
5,600	777D562F035AN2A	1.375 x 1.625	89.4	3.66
8,200	777D822F035AY2A	1.375 x 1.875	67.7	4.42
10,000	777D103F035AA2A	1.375 x 2.125	54.9	5.15
12,000	777D123F035AM2A	1.375 x 2.625	40.5	6.51
18,000	777D183F035AB2A	1.375 x 3.125	32.6	7.78
22,000	777D223F035AL2A	1.375 x 3.625	27.6	9.00
27,000	777D273F035AD2A	1.375 x 4.625	21.6	11.28
33,000	777D333F035AE2A	1.375 x 5.125	19.7	12.36
39,000	777D393F035AF2A	1.375 x 5.625	18.2	13.41
13,000	777D133F035BY2A	2.000 x 1.875	43.2	7.08
18,000	777D183F035BA2A	2.000 x 2.125	32.8	8.48
27,000	777D273F035BM2A	2.000 x 2.625	22.5	11.01
33,000	777D333F035BB2A	2.000 x 3.125	17.5	13.33
47,000	777D473F035BL2A	2.000 x 3.625	14.5	15.51
56,000	777D563F035BD2A	2.000 x 4.625	11.1	19.55
68,000	777D683F035BE2A	2.000 x 5.125	10.0	21.45
82,000	777D823F035BF2A	2.000 x 5.625	9.2	23.29
50 VOLTS DC WORKING; 65 VOLTS DC SURGE				
3,300	777D332F050AN2A	1.375 x 1.625	96.6	3.52
4,700	777D472F050AY2A	1.375 x 1.875	73.0	4.26
5,600	777D562F050AA2A	1.375 x 2.125	59.2	4.96
8,200	777D821F050AM2A	1.375 x 2.625	43.5	6.28
10,000	777D103F050AB2A	1.375 x 3.125	34.9	7.52
12,000	777D123F050AL2A	1.375 x 3.625	29.5	8.70
15,000	777D153F050AD2A	1.375 x 4.625	26.6	9.56
18,000	777D183F050AE2A	1.375 x 5.125	20.9	12.00
22,000	777D223F050AF2A	1.375 x 5.625	19.3	13.02
8,200	777D822F050BY2A	2.000 x 1.875	46.4	6.83
10,000	777D103F050BA2A	2.000 x 2.125	35.1	8.19
15,000	777D153F050BM2A	2.000 x 2.625	24.1	10.65
22,000	777D223F050BB2A	2.000 x 3.125	18.6	12.91
27,000	777D273F050BL2A	2.000 x 3.625	15.4	15.04
33,000	777D333F050BD2A	2.000 x 4.625	11.7	19.00
39,000	777D393F050BE2A	2.000 x 5.125	10.6	20.86
47,000	777D473F050BF2A	2.000 x 5.625	9.7	22.67

STANDARD RATINGS

µF	Catalog Number	Nominal Case Size (inch) D x L	Max. ESR 120Hz, +25°C (mΩ)	Max. Ripple Current 120Hz, +85°C (A)
63 VOLTS DC WORKING; 80 VOLTS DC SURGE				
3,300	777D332F063AY2A	1.375 x 1.875	76.7	4.16
4,700	777D472F063AA2A	1.375 x 2.125	62.1	4.84
5,600	777D562F063AM2A	1.375 x 2.625	45.6	6.13
8,200	777D822F063AB2A	1.375 x 3.125	36.5	7.35
10,000	777D103F063AL2A	1.375 x 3.625	30.8	8.51
12,000	777D123F063AD2A	1.375 x 4.625	24.0	10.71
15,000	777D153F063AE2A	1.375 x 5.125	21.8	11.76
18,000	777D183F063AF2A	1.375 x 5.625	20.0	12.78
5,600	777D562F063BY2A	2.000 x 1.875	48.5	6.68
8,200	777D822F063BA2A	2.000 x 2.125	36.7	8.01
12,000	777D123F063BM2A	2.000 x 2.625	25.1	10.43
15,000	777D153F063BB2A	2.000 x 3.125	19.4	12.65
18,000	777D183F063BL2A	2.000 x 3.625	16.0	14.75
22,000	777D223F063BC2A	2.000 x 4.125	13.8	16.74
27,000	777D273F063BD2A	2.000 x 4.625	12.2	18.65
33,000	777D333F063BE2A	2.000 x 5.125	11.0	20.50
39,000	777D393F063BF2A	2.000 x 5.625	10.1	22.28
100 VOLTS DC WORKING; 125 VOLTS DC SURGE				
1,000	777D102F100AN2A	1.375 x 1.625	134.5	2.98
1,200	777D122F100AY2A	1.375 x 1.875	101.1	3.62
1,500	777D152F100AA2A	1.375 x 2.125	81.5	4.22
2,200	777D222F100AM2A	1.375 x 2.625	59.4	5.37
2,700	777D272F100AB2A	1.375 x 3.125	47.2	6.47
3,900	777D392F100AL2A	1.375 x 3.625	39.5	7.52
4,700	777D472F100AD2A	1.375 x 4.625	30.3	9.52
5,600	777D562F100AE2A	1.375 x 5.125	27.4	10.49
6,800	777D682F100AF2A	1.375 x 5.625	25.0	11.43
2,200	777D222F100BY2A	2.000 x 1.875	63.2	5.85
2,700	777D272F100BA2A	2.000 x 2.125	47.6	7.03
4,700	777D472F100BM2A	2.000 x 2.625	32.3	9.19
5,600	777D562F100BB2A	2.000 x 3.125	24.8	11.20
6,800	777D682F100BL2A	2.000 x 3.625	20.3	13.10
8,200	777D822F100BC2A	2.000 x 4.125	17.3	14.92
10,000	777D103F100BD2A	2.000 x 4.625	15.2	16.68
12,000	777D123F100BF2A	2.000 x 5.625	12.4	20.05
160 VOLTS DC WORKING; 185 VOLTS DC SURGE				
470	777D471F160AN2A	1.375 x 1.625	266.3	2.12
560	777D561F160AY2A	1.375 x 1.875	198.9	2.58
820	777D821F160AA2A	1.375 x 2.125	159.2	3.02
1,000	777D102F160AM2A	1.375 x 2.625	114.5	3.87
1,500	777D152F160AB2A	1.375 x 3.125	89.9	4.68
1,800	777D182F160AL2A	1.375 x 3.625	74.4	5.48
2,200	777D222F160AD2A	1.375 x 4.625	55.8	7.02
2,700	777D272F160AF2A	1.375 x 5.625	45.1	8.51
1,000	777D102F160BY2A	2.000 x 1.875	121.3	4.22
1,200	777D122F160BA2A	2.000 x 2.125	90.7	5.09
2,200	777D222F160BM2A	2.000 x 2.625	60.7	6.70
2,700	777D272F160BB2A	2.000 x 3.125	46.0	8.22
3,300	777D332F160BL2A	2.000 x 3.625	37.2	9.67
3,900	777D392F160BC2A	2.000 x 4.125	31.4	11.09
4,700	777D472F160BD2A	2.000 x 4.625	27.3	12.47
5,600	777D562F160BE2A	2.000 x 5.125	24.2	13.82
6,800	777D682F160BF2A	2.000 x 5.625	21.8	15.14

STANDARD RATINGS

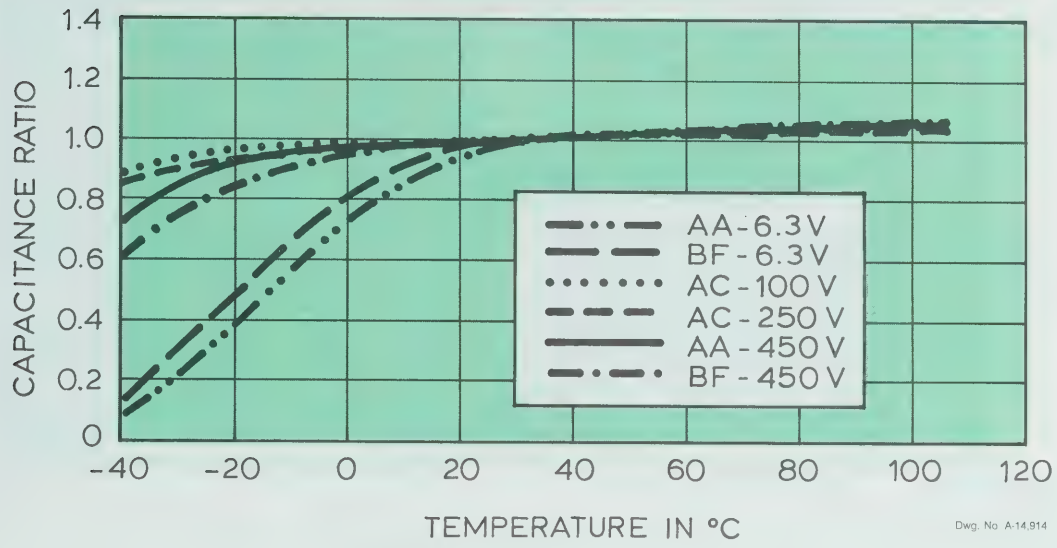
µF	Catalog Number	Nominal Case Size (inch) D x L	Max. ESR 120Hz, +25°C (mΩ)	Max. Ripple Current 120Hz, +85°C (A)
200 VOLTS DC WORKING; 250 VOLTS DC SURGE				
390	777D391F200AN2A	1.375 x 1.625	288.0	2.04
560	777D561F200AY2A	1.375 x 1.875	215.1	2.48
680	777D681F200AA2A	1.375 x 2.125	172.1	2.91
1,000	777D102F200AM2A	1.375 x 2.625	123.6	3.72
1,200	777D122F200AB2A	1.375 x 3.125	96.9	4.51
1,500	777D152F200AL2A	1.375 x 3.625	80.1	5.28
1,800	777D182F200AD2A	1.375 x 4.625	60.0	6.77
2,200	777D222F200AE2A	1.375 x 5.125	53.5	7.50
2,700	777D272F200AF2A	1.375 x 5.625	48.4	8.21
820	777D821F200BY2A	2.000 x 1.875	131.0	4.06
1,200	777D122F200BA2A	2.000 x 2.125	97.9	4.90
1,800	777D182F200BM2A	2.000 x 2.625	65.5	6.46
2,200	777D222F200BB2A	2.000 x 3.125	49.5	7.92
2,700	777D272F200BL2A	2.000 x 3.625	40.0	9.33
3,900	777D392F200BD2A	2.000 x 4.625	29.3	12.03
4,700	777D472F200BE2A	2.000 x 5.125	25.9	13.34
5,600	777D562F200BF2A	2.000 x 5.625	23.3	14.63
250 VOLTS DC WORKING; 300 VOLTS DC SURGE				
270	777D271F250AN2A	1.375 x 1.625	331.0	1.90
390	777D391F250AY2A	1.375 x 1.875	247.0	2.31
470	777D471F250AA2A	1.375 x 2.125	197.4	2.71
680	777D681F250AM2A	1.375 x 2.625	141.5	3.48
1,000	777D102F250AB2A	1.375 x 3.125	110.9	4.22
1,200	777D122F250AL2A	1.375 x 3.625	91.5	4.94
1,500	777D152F250AD2A	1.375 x 4.625	68.3	6.34
1,800	777D182F250AF2A	1.375 x 5.625	55.0	7.71
680	777D681F250BY2A	2.000 x 1.875	150.1	3.36
820	777D821F250BA2A	2.000 x 2.125	112.0	4.05
1,500	777D152F250BM2A	2.000 x 2.625	74.8	5.32
1,800	777D182F250BB2A	2.000 x 3.125	56.5	6.51
2,200	777D222F250BL2A	2.000 x 3.625	45.6	7.65
2,700	777D272F250BC2A	2.000 x 4.125	38.4	8.75
3,300	777D332F250BD2A	2.000 x 4.625	33.2	9.82
3,900	777D392F250BF2A	2.000 x 5.625	26.4	11.89
300 VOLTS DC WORKING; 350 VOLTS DC SURGE				
150	777D151F300AN2A	1.375 x 1.625	1295.0	0.96
220	777D221F300AY2A	1.375 x 1.875	963.0	1.17
280	777D281F300AA2A	1.375 x 2.125	766.0	1.37
390	777D391F300AM2A	1.375 x 2.625	545.0	1.77
470	777D471F300AB2A	1.375 x 3.125	424.0	2.16
560	777D561F300AL2A	1.375 x 3.625	347.0	2.54
820	777D821F300AD2A	1.375 x 4.625	255.0	3.28
1,000	777D102F300AF2A	1.375 x 5.625	202.0	4.02
390	777D391F300BY2A	2.000 x 1.875	613.0	1.88
470	777D471F300BA2A	2.000 x 2.125	456.0	2.27
820	777D821F300BM2A	2.000 x 2.625	303.0	3.00
1,000	777D102F300BB2A	2.000 x 3.125	227.0	3.70
1,200	777D122F300BL2A	2.000 x 3.625	183.0	4.37
1,500	777D152F300BC2A	2.000 x 4.125	153.0	5.03
1,800	777D182F300BE2A	2.000 x 5.125	116.0	6.32
2,200	777D222F300BF2A	2.000 x 5.625	103.0	6.96

STANDARD RATINGS

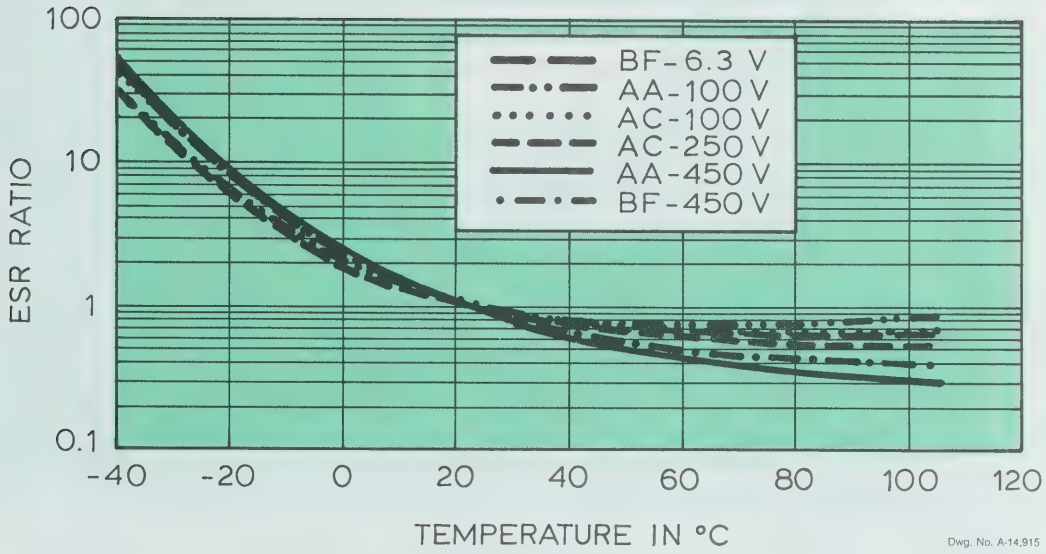
µF	Catalog Number	Nominal Case Size (inch) D x L	Max. ESR 120Hz, +25°C (mΩ)	Max. Ripple Current 120Hz, +85°C (A)
350 VOLTS DC WORKING; 400 VOLTS DC SURGE				
150	777D151F350AN2A	1.375 x 1.625	1348.0	0.94
180	777D181F350AY2A	1.375 x 1.875	1002.0	1.00
220	777D221F350AA2A	1.375 x 2.125	797.0	1.35
330	777D331F350AM2A	1.375 x 2.625	567.0	1.74
470	777D471F350AB2A	1.375 x 3.125	441.0	2.11
560	777D561F350AL2A	1.375 x 3.625	361.0	2.49
680	777D681F350AD2A	1.375 x 4.625	265.0	3.22
820	777D821F350AE2A	1.375 x 5.125	234.0	3.58
1,000	777D102F350AF2A	1.375 x 5.625	210.0	3.94
330	777D331F350BY2A	2.000 x 1.875	636.0	1.84
470	777D471F350BA2A	2.000 x 2.125	473.0	2.23
680	777D681F350BM2A	2.000 x 2.625	314.0	2.95
820	777D821F350BB2A	2.000 x 3.125	236.0	3.63
1,000	777D102F350BL2A	2.000 x 3.625	189.0	4.29
1,200	777D122F350BC2A	2.000 x 4.125	158.0	4.94
1,500	777D152F350BD2A	2.000 x 4.625	136.0	5.58
1,800	777D182F350BF2A	2.000 x 5.625	107.0	6.84
400 VOLTS DC WORKING; 450 VOLTS DC SURGE				
120	777D121F400AN2A	1.375 x 1.625	1425.0	0.91
150	777D151F400AY2A	1.375 x 1.875	1059.0	1.12
220	777D221F400AA2A	1.375 x 2.125	843.0	1.31
270	777D271F400AM2A	1.375 x 2.625	599.0	1.69
390	777D391F400AB2A	1.375 x 3.125	466.0	2.06
470	777D471F400AL2A	1.375 x 3.625	381.0	2.42
560	777D561F400AD2A	1.375 x 4.625	280.0	3.13
680	777D681F400AE2A	1.375 x 5.125	248.0	3.49
820	777D821F400AF2A	1.375 x 5.625	222.0	3.84
270	777D271F400BY2A	2.000 x 1.875	670.0	1.79
390	777D391F400BA2A	2.000 x 2.125	499.0	2.17
560	777D561F400BM2A	2.000 x 2.625	331.0	2.87
680	777D681F400BB2A	2.000 x 3.125	248.0	3.54
820	777D821F400BL2A	2.000 x 3.625	199.0	4.18
1,000	777D102F400BC2A	2.000 x 4.125	167.0	4.82
1,200	777D122F400BD2A	2.000 x 4.625	143.0	5.44
1,500	777D152F400BE2A	2.000 x 5.125	126.0	6.06
1,800	777D182F400BF2A	2.000 x 5.625	113.0	6.67
450 VOLTS DC WORKING; 525 VOLTS DC SURGE				
100	777D101F450AN2A	1.375 x 1.625	1536.0	0.88
120	777D121F450AY2A	1.375 x 1.875	1141.0	1.07
150	777D151F450AA2A	1.375 x 2.125	908.0	1.26
220	777D221F450AM2A	1.375 x 2.625	646.0	1.63
270	777D271F450AB2A	1.375 x 3.125	502.0	1.98
390	777D391F450AL2A	1.375 x 3.625	410.0	2.33
470	777D471F450AD2A	1.375 x 4.625	302.0	3.02
560	777D561F450AE2A	1.375 x 5.125	267.0	3.36
680	777D681F450AF2A	1.375 x 5.625	239.0	3.70
220	777D221F450BY2A	2.000 x 1.875	719.0	1.73
270	777D271F450BA2A	2.000 x 2.125	535.0	2.09
470	777D471F450BM2A	2.000 x 2.625	355.0	2.77
560	777D561F450BB2A	2.000 x 3.125	266.0	3.42
680	777D681F450BL2A	2.000 x 3.625	214.0	4.04
820	777D821F450BC2A	2.000 x 4.125	179.0	4.65
1,000	777D102F450BD2A	2.000 x 4.625	154.0	5.26
1,200	777D122F450BF2A	2.000 x 5.625	121.0	6.44

TYPICAL CURVES

CAPACITANCE RATIO VS. TEMPERATURE
777D — 105C

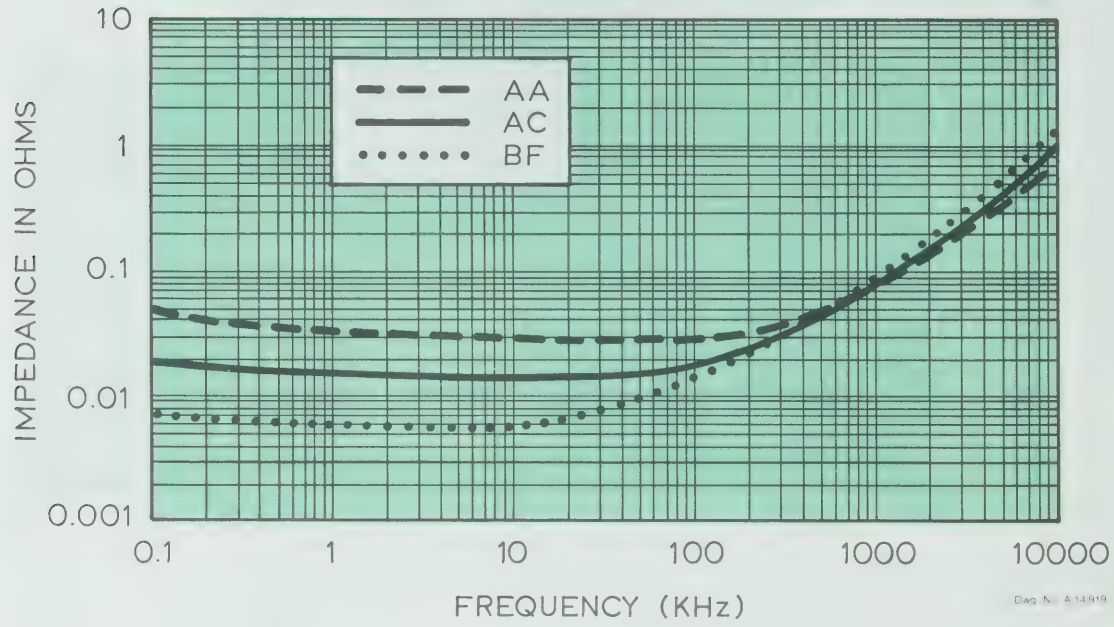


ESR RATIO VS. TEMPERATURE
777D — 105C

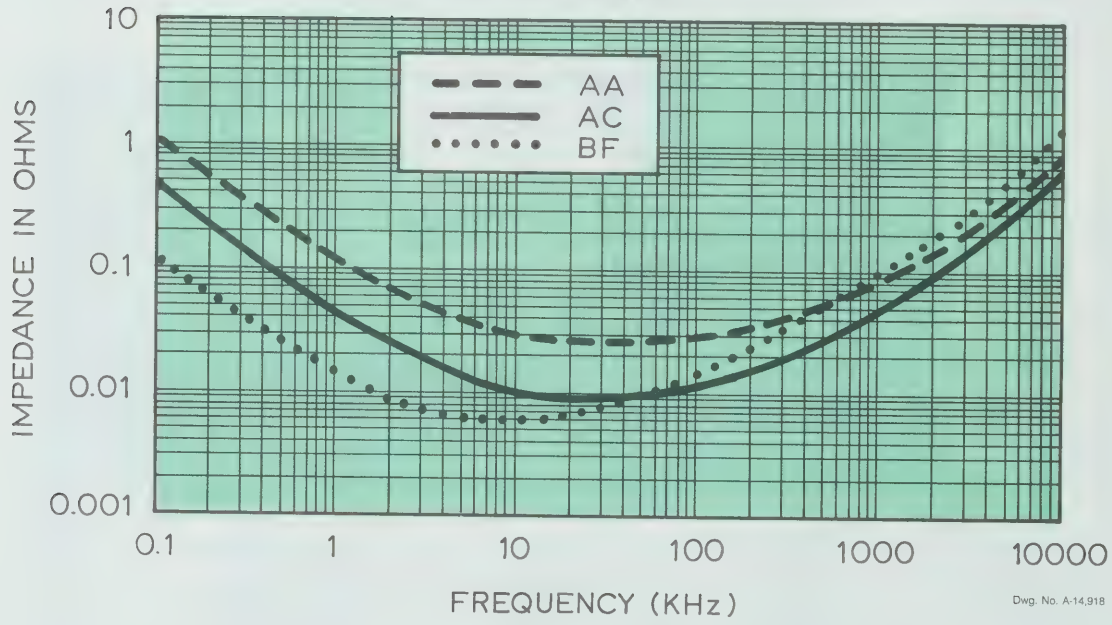


TYPICAL CURVES

IMPEDANCE VS. FREQUENCY
777D — 6.3VDC

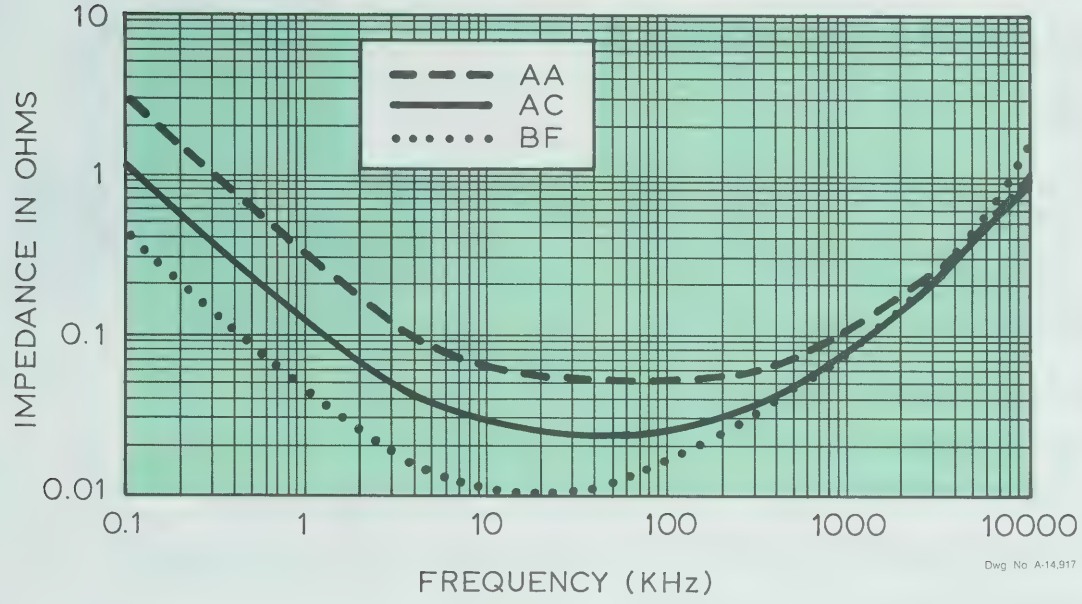


IMPEDANCE VS. FREQUENCY
777D — 100VDC

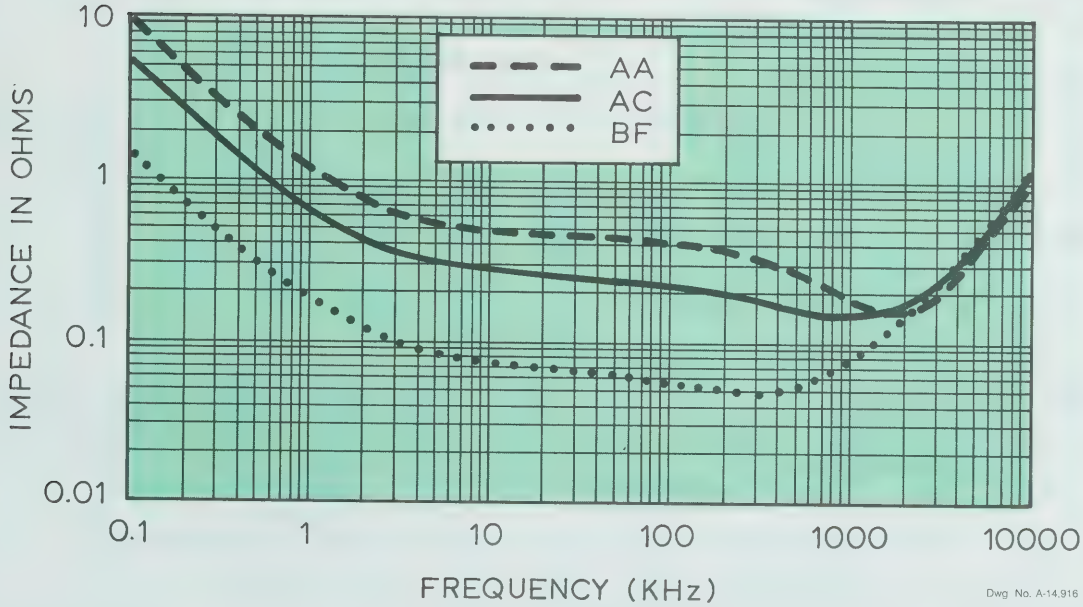


TYPICAL CURVES

IMPEDANCE VS. FREQUENCY
777D — 250VDC



IMPEDANCE VS. FREQUENCY
777D — 450VDC



+85°C Large Can Aluminum Capacitors

Features —

- For Low Temperature Applications to −55°C
- Mil Version to MIL-C-39018/04
- Stud Mount Available
- Metric Threads Available

L65-21

General Specifications —

Operating Temperature: −55°C to +85°C.

Voltage Range: 6.3 - 250 VDC.

Capacitance Range: 180μF - 820,000μF.

Capacitance Tolerance: −10%, +50%.

Case Size Range: 1.375″ x 1.625″ - 3.0″ x 8.625″.

Termination: Screw inserts or solderable terminals.

Life Validation Test: 2000 hours at +85°C:
- Δ CAP ≤ 20% from initial measurement.
- Δ ESR ≤ 1.3x initial specified limit.
- Δ DCL ≤ initial specified limit.

Shelf Test: 250 hours at +85°C:
- Δ CAP 15% from initial measurement.
- Δ ESR 1.5x initial specified limit.
- Δ DCL ≤ 2.0x initial specified limit.

DC Leakage Current: 5 min. charge time.

$$I = K\sqrt{CV}$$

K = 1.5 at +25°C; 9.0 at +85°C.

C in μF, V in Volts, I in μA

Ripple Current Multipliers:

TEMPERATURE				
Ambient Temperature				
+85°C	+75°C	+65°C	+55°C	+45°C & Below
1.0	1.4	1.7	2.0	2.65

The rated 120 Hz rms ripple current for capacitors with cases 1⅜″ (34.9 mm) and 2″ (50.8 mm) in diameter must be multiplied by the factors shown in the following table:

WVDC Rated	Frequency in Hz				
	50	60	100	400	1000 & Up
0-50	0.80	0.85	0.98	1.10	1.15
51-250	0.78	0.83	0.96	1.15	1.20

The rated 120 Hz rms ripple current for capacitors with cases 2½″ (63.5 mm) and 3″ (76.2 mm) in diameter must be multiplied by the factors shown in the following table:

WVDC Rated	Frequency in Hz				
	50	60	100	400	1000 & Up
0-50	0.85	0.90	0.99	1.02	1.02
51-250	0.85	0.90	0.98	1.07	1.07

Low Temperature Performance:

Capacitance Ratio $C^{-55°C}/C^{+25°C}$ min. @ 120Hz

Rated Voltage (VDC)	Capacitance Remaining
0 to 9	65
10 to 40	75
41 to 100	80
101 to 250	60

Imp. Ratio $Z^{-55°C}/Z^{+25°C}$ max. @ 120Hz

Rated Voltage (VDC)	Multiplier
0 to 9	7
10 to 40	3
41 to 250	2

Performance Characteristics —

SEE PAGE 2.

Catalog Numbering System

602D 183 F 6R3 AN 2 A

LEAD CODE: A = LOW INSERT 10-32 SCREW THREAD (Standard)
B = HIGH INSERT 10-32 SCREW THREAD
D = HIGH CURRENT ¼-28 SCREW THREAD
I = HIGH INSERT M5 SCREW THREAD
P = KEYED POLARITY VERTICAL MOUNT.*

CASE STYLE: 2 = PVC INSULATING SLEEVE (Standard)
5 = PVC SLEEVE WITH RESIN END SEAL**
Required for exposure to
halogenated cleaning solvents.

CASE CODE. SEE DIMENSIONS.

DC VOLTAGE RATING. IN VOLTS. AN 'R' IS USED TO SIGNIFY A DECIMAL POINT. FOR EXAMPLE, 6R3 = 6.3 VOLTS.

CAPACITANCE TOLERANCE. F = −10, +50%.

CAPACITANCE. EXPRESSED IN MICROFARADS. THE FIRST TWO DIGITS ARE SIGNIFICANT FIGURES, THE THIRD IS THE NUMBER OF ZEROS.

TYPE NUMBER. IDENTIFIES THE BASIC CAPACITOR DESIGN.

*Available on 1.375″, 1.750″ and 2.000″ dia. units.
**Optional on Lead Code 'P' only.

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size (inches) D x L	Max. ESR 120Hz, +25°C (mΩ)	Max. Ripple Current 120Hz, +85°C (A)
6.3 VOLTS DC WORKING; 9 VOLTS DC SURGE				
18,000	602D183F6R3AN2A	1.375 x 1.625	46.0	5.1
27,000	602D273F6R3AA2A	1.375 x 2.125	29.0	7.1
39,000	602D393F6R3AM2A	1.375 x 2.625	22.0	8.8
47,000	602D473F6R3AB2A	1.375 x 3.125	18.2	10.4
68,000	602D683F6R3AL2A	1.375 x 3.625	15.7	11.9
82,000	602D823F6R3AC2A	1.375 x 4.125	14.1	13.3
100,000	602D104F6R3AE2A	1.375 x 5.125	12.0	15.8
120,000	602D124F6R3AF2A	1.375 x 5.625	11.3	17.0
39,000	602D393F6R3BY2A	2.000 x 1.875	24.0	9.6
56,000	602D563F6R3BA2A	2.000 x 2.125	18.2	11.3
82,000	602D823F6R3BM2A	2.000 x 2.625	13.1	14.4
100,000	602D104F6R3BB2A	2.000 x 3.125	10.5	17.2
120,000	602D124F6R3BL2A	2.000 x 3.625	9.0	19.6
150,000	602D154F6R3BC2A	2.000 x 4.125	8.0	21.9
180,000	602D184F6R3BD2A	2.000 x 4.625	7.3	24.1
220,000	602D224F6R3BF2A	2.000 x 5.625	6.4	27.9
180,000	602D184F6R3CB2A	2.500 x 3.125	5.8	26.6
270,000	602D274F6R3CC2D	2.500 x 4.125	4.7	32.8
330,000	602D334F6R3CD2D	2.500 x 4.625	4.3	35.8
390,000	602D394F6R3CF2D	2.500 x 5.625	4.0	40.2
330,000	602D334F6R3DL2D	3.000 x 3.625	5.1	33.7
390,000	602D394F6R3DC2D	3.000 x 4.125	4.7	36.7
470,000	602D474F6R3DD2D	3.000 x 4.625	4.3	40.1
560,000	602D564F6R3DE2D	3.000 x 5.125	4.1	42.7
680,000	602D684F6R3DF2D	3.000 x 5.625	3.9	45.4
820,000	602D824F6R3DJ2D	3.000 x 8.625	3.3	50.0
10 VOLTS DC WORKING; 15 VOLTS DC SURGE				
12,000	602D123F010AN2A	1.375 x 1.625	47.0	5.0
22,000	602D223F010AA2A	1.375 x 2.125	30.0	7.0
27,000	602D273F010AM2A	1.375 x 2.625	23.0	8.7
39,000	602D393F010AB2A	1.375 x 3.125	18.6	10.3
47,000	602D473F010AL2A	1.375 x 3.625	16.2	11.7
56,000	602D563F010AC2A	1.375 x 4.125	14.4	13.1
68,000	602D683F010AD2A	1.375 x 4.625	13.2	14.4
82,000	602D823F010AF2A	1.375 x 5.625	11.4	16.9
27,000	602D273F010BY2A	2.000 x 1.875	24.0	9.5
39,000	602D393F010BA2A	2.000 x 2.125	18.5	11.2
56,000	602D563F010BM2A	2.000 x 2.625	13.2	14.3
82,000	602D823F010BB2A	2.000 x 3.125	10.6	17.1
100,000	602D104F010BL2A	2.000 x 3.625	9.1	19.5
120,000	602D124F010BC2A	2.000 x 4.125	8.1	21.8
180,000	602D184F010BF2A	2.000 x 5.625	6.4	27.9
120,000	602D124F010CB2A	2.500 x 3.125	5.9	26.4
180,000	602D184F010CC2D	2.500 x 4.125	4.8	32.4
220,000	602D224F010CD2D	2.500 x 4.625	4.4	35.4
270,000	602D274F010CF2D	2.500 x 5.625	4.0	40.2
220,000	602D224F010DL2D	3.000 x 3.625	5.1	33.7
270,000	602D274F010DC2D	3.000 x 4.125	4.7	36.7
330,000	602D334F010DD2D	3.000 x 4.625	4.3	40.1
390,000	602D394F010DE2D	3.000 x 5.125	4.1	42.7
470,000	602D474F010DF2D	3.000 x 5.625	4.0	44.8
680,000	602D684F010DJ2D	3.000 x 8.625	3.3	50.0

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size (inches) D x L	Max. ESR 120Hz, +25°C (mΩ)	Max. Ripple Current 120Hz, +85°C (A)
16 VOLTS DC WORKING; 20 VOLTS DC SURGE				
10,000	602D103F016AN2A	1.375 x 1.625	50.0	4.9
15,000	602D153F016AA2A	1.375 x 2.125	32.0	6.7
22,000	602D223F016AM2A	1.375 x 2.625	24.0	8.4
27,000	602D273F016AB2A	1.375 x 3.125	19.5	10.0
33,000	602D333F016AL2A	1.375 x 3.625	16.9	11.5
39,000	602D393F016AC2A	1.375 x 4.125	15.1	12.8
47,000	602D473F016AD2A	1.375 x 4.625	13.7	14.1
56,000	602D563F016AE2A	1.375 x 5.125	12.7	15.4
22,000	602D223F016BY2A	2.000 x 1.875	26.0	9.2
27,000	602D273F016BA2A	2.000 x 2.125	19.7	10.9
39,000	602D393F016BM2A	2.000 x 2.625	14.1	13.9
56,000	602D563F016BB2A	2.000 x 3.125	11.3	16.5
68,000	602D683F016BL2A	2.000 x 3.625	9.6	19.0
82,000	602D823F016BC2A	2.000 x 4.125	8.6	21.1
100,000	602D104F016BD2A	2.000 x 4.625	7.8	23.3
120,000	602D124F016BE2A	2.000 x 5.625	6.7	27.3
100,000	602D104F016CB2A	2.500 x 3.125	6.4	25.3
150,000	602D154F016CC2D	2.500 x 4.125	5.0	31.8
180,000	602D184F016CD2D	2.500 x 4.625	4.7	34.3
220,000	602D224F016CF2D	2.500 x 5.625	4.2	39.2
180,000	602D184F016DL2D	3.000 x 3.625	5.6	32.1
220,000	602D224F016DC2D	3.000 x 4.125	5.0	35.6
270,000	602D274F016DE2D	3.000 x 5.125	4.4	41.2
330,000	602D334F016DF2D	3.000 x 5.625	4.2	43.8
560,000	602D564F016DJ2D	3.000 x 8.625	3.5	50.0
25 VOLTS DC WORKING; 40 VOLTS DC SURGE				
5,600	602D562F025AN2A	1.375 x 1.625	52.0	4.7
10,000	602D103F025AA2A	1.375 x 2.125	33.0	6.6
12,000	602D123F025AM2A	1.375 x 2.625	25.0	8.3
18,000	602D183F025AB2A	1.375 x 3.125	20.0	9.8
22,000	602D223F025AL2A	1.375 x 3.625	17.7	11.2
27,000	602D273F025AD2A	1.375 x 4.625	14.3	13.8
33,000	602D333F025AE2A	1.375 x 5.125	13.2	15.1
12,000	602D123F025BY2A	2.000 x 1.875	26.0	9.0
18,000	602D183F025BA2A	2.000 x 2.125	20.0	10.7
27,000	602D273F025BM2A	2.000 x 2.625	14.4	13.7
33,000	602D333F025BB2A	2.000 x 3.125	11.6	16.3
39,000	602D393F025BL2A	2.000 x 3.625	9.8	18.8
47,000	602D473F025BC2A	2.000 x 4.125	8.7	21.0
56,000	602D563F025BD2A	2.000 x 4.625	7.9	23.1
82,000	602D823F025BF2A	2.000 x 5.625	6.8	27.1
56,000	602D563F025CB2A	2.500 x 3.125	6.6	24.9
82,000	602D823F025CC2D	2.500 x 4.125	5.2	31.2
100,000	602D104F025CD2D	2.500 x 4.625	4.9	33.6
120,000	602D124F025CF2D	2.500 x 5.625	4.3	38.8
100,000	602D104F025DL2D	3.000 x 3.625	5.7	31.8
120,000	602D124F025DC2D	3.000 x 4.125	5.1	35.3
150,000	602D154F025DD2D	3.000 x 4.625	4.8	37.9
180,000	602D184F025DE2D	3.000 x 5.125	4.4	41.2
330,000	602D334F025DJ2D	3.000 x 8.625	3.5	50.0
35 VOLTS DC WORKING; 50 VOLTS DC SURGE				
4,700	602D472F035AN2A	1.375 x 1.625	60.0	4.4
6,800	602D682F035AA2A	1.375 x 2.125	37.0	6.2
10,000	602D103F035AM2A	1.375 x 2.625	28.0	7.8
12,000	602D123F035AB2A	1.375 x 3.125	23.0	9.2
15,000	602D153F035AL2A	1.375 x 3.625	19.8	10.6
22,000	602D223F035AD2A	1.375 x 4.625	15.7	13.2
27,000	602D273F035AE2A	1.375 x 5.125	14.6	14.3

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size (inches) D x L	Max. ESR 120Hz, +25°C (mΩ)	Max. Ripple Current 120Hz, +85°C (A)
35 VOLTS DC WORKING; 50 VOLTS DC SURGE (Cont.)				
10,000	602D103F035BY2A	2.000 x 1.875	29.0	8.6
12,000	602D123F035BA2A	2.000 x 2.125	22.0	10.2
18,000	602D183F035BM2A	2.000 x 2.625	15.8	13.1
27,000	602D273F035BB2A	2.000 x 3.125	12.6	15.7
33,000	602D333F035BL2A	2.000 x 3.625	10.6	18.1
39,000	602D393F035BC2A	2.000 x 4.125	9.4	20.2
47,000	602D473F035BD2A	2.000 x 4.625	8.5	22.3
56,000	602D563F035BF2A	2.000 x 5.625	7.3	26.1
56,000	602D563F035CB2A	2.500 x 3.125	7.3	23.7
68,000	602D683F035CC2A	2.500 x 4.125	5.7	29.8
82,000	602D823F035CD2D	2.500 x 4.625	5.2	32.6
100,000	602D104F035CF2D	2.500 x 5.625	4.5	37.9
82,000	602D823F035DL2D	3.000 x 3.625	5.9	31.3
100,000	602D104F035DC2D	3.000 x 4.125	5.4	34.3
120,000	602D124F035DD2D	3.000 x 4.625	4.9	37.5
150,000	602D154F035DE2D	3.000 x 5.125	4.7	39.9
180,000	602D184F035DF2D	3.000 x 5.625	4.4	42.0
220,000	602D224F035DJ2D	3.000 x 8.625	3.6	50.0
50 VOLTS DC WORKING; 75 VOLTS DC SURGE				
2,700	602D272F050AN2A	1.375 x 1.625	64.0	4.3
4,700	602D472F050AA2A	1.375 x 2.125	40.0	6.0
5,600	602D562F050AM2A	1.375 x 2.625	30.0	7.6
8,200	602D822F050AB2A	1.375 x 3.125	24.0	9.0
10,000	602D103F050AL2A	1.375 x 3.625	21.0	10.4
12,000	602D123F050AD2A	1.375 x 4.625	16.9	12.7
15,000	602D153F050AE2A	1.375 x 5.125	15.4	13.9
5,600	602D562F050BY2A	2.000 x 1.875	31.0	8.4
8,200	602D822F050BA2A	2.000 x 2.125	24.0	10.0
12,000	602D123F050BM2A	2.000 x 2.625	16.9	12.7
15,000	602D153F050BB2A	2.000 x 3.125	13.3	15.2
18,000	602D183F050BL2A	2.000 x 3.625	11.2	17.6
22,000	602D223F050BC2A	2.000 x 4.125	9.8	19.8
27,000	602D273F050BD2A	2.000 x 4.625	8.8	21.9
33,000	602D333F050BF2A	2.000 x 5.625	7.5	25.8
27,000	602D273F050CB2A	2.500 x 3.125	7.7	23.1
39,000	602D393F050CC2A	2.500 x 4.125	5.9	29.3
47,000	602D473F050CD2D	2.500 x 4.625	5.5	31.7
56,000	602D563F050CF2D	2.500 x 5.625	4.8	36.7
47,000	602D473F050DL2D	3.000 x 3.625	6.2	30.5
56,000	602D563F050DC2D	3.000 x 4.125	5.5	34.0
68,000	602D683F050DD2D	3.000 x 4.625	5.0	37.2
82,000	602D823F050DE2D	3.000 x 5.125	4.8	39.5
150,000	602D154F050DJ2D	3.000 x 8.625	3.6	56.3
63 VOLTS DC WORKING; 90 VOLTS DC SURGE				
1,800	602D182F063AN2A	1.375 x 1.625	71.0	4.1
3,300	602D332F063AA2A	1.375 x 2.125	44.0	5.7
4,700	602D472F063AM2A	1.375 x 2.625	33.0	7.2
5,600	602D562F063AB2A	1.375 x 3.125	26.0	8.6
6,800	602D682F063AL2A	1.375 x 3.625	23.0	9.9
8,200	602D822F063AC2A	1.375 x 4.125	19.8	11.2
10,000	602D103F063AD2A	1.375 x 4.625	18.2	12.3
12,000	602D123F063AE2A	1.375 x 5.125	16.3	13.5

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size (inches) D x L	Max. ESR 120Hz, +25°C (mΩ)	Max. Ripple Current 120Hz, +85°C (A)
63 VOLTS DC WORKING; 90 VOLTS DC SURGE (Cont.)				
4,700	602D472F063BY2A	2.000 x 1.875	34.0	7.9
5,600	602D562F063BA2A	2.000 x 2.125	26.0	9.5
8,200	602D822F063BM2A	2.000 x 2.625	18.1	12.2
12,000	602D123F063BB2A	2.000 x 3.125	14.6	14.5
15,000	602D153F063BL2A	2.000 x 3.625	12.3	16.8
18,000	602D183F063BC2A	2.000 x 4.125	10.5	19.1
22,000	602D223F063BD2A	2.000 x 4.625	9.5	21.1
27,000	602D273F063BF2A	2.000 x 5.625	8.1	24.8
18,000	602D183F063CB2A	2.500 x 3.125	8.5	22.0
27,000	602D273F063CC2A	2.500 x 4.125	6.4	28.1
33,000	602D333F063CD2D	2.500 x 4.625	5.8	30.8
47,000	602D473F063CF2D	2.500 x 5.625	5.0	35.9
39,000	602D393F063DL2D	3.000 x 3.625	6.4	30.0
47,000	602D473F063DC2D	3.000 x 4.125	5.7	33.4
56,000	602D563F063DD2D	3.000 x 4.625	5.2	36.4
68,000	602D683F063DF2D	3.000 x 5.625	4.5	42.3
120,000	602D124F063DJ2D	3.000 x 8.625	3.7	55.6
100 VOLTS DC WORKING; 150 VOLTS DC SURGE				
680	602D681F100AN2A	1.375 x 1.625	169.0	2.6
1,200	602D122F100AA2A	1.375 x 2.125	104.0	3.7
1,500	602D152F100AM2A	1.375 x 2.625	75.0	4.8
2,200	602D222F100AB2A	1.375 x 3.125	59.0	5.8
2,700	602D272F100AL2A	1.375 x 3.625	49.0	6.7
3,300	602D332F100AD2A	1.375 x 4.625	37.0	8.6
3,900	602D392F100AE2A	1.375 x 5.125	33.0	9.5
4,700	602D472F100AF2A	1.375 x 5.625	30.0	10.4
1,500	602D152F100BY2A	2.000 x 1.875	80.0	5.2
2,200	602D222F100BA2A	2.000 x 2.125	59.0	6.3
3,300	602D332F100BM2A	2.000 x 2.625	40.0	8.2
3,900	602D392F100BB2A	2.000 x 3.125	30.0	10.1
5,600	602D562F100BL2A	2.000 x 3.625	25.0	11.9
6,800	602D682F100BC2A	2.000 x 4.125	21.0	13.5
10,000	602D103F100BF2A	2.000 x 5.625	15.0	18.2
6,800	602D682F100CB2A	2.500 x 3.125	17.5	15.3
10,000	602D103F100CC2A	2.500 x 4.125	12.8	19.8
12,000	602D123F100CD2A	2.500 x 4.625	11.2	22.2
15,000	602D153F100CF2A	2.500 x 5.625	9.1	26.6
12,000	602D123F100DL2A	3.000 x 3.625	11.3	22.6
15,000	602D153F100DC2A	3.000 x 4.125	9.7	25.6
18,000	602D183F100DD2A	3.000 x 4.625	8.7	28.2
22,000	602D223F100DE2D	3.000 x 5.125	8.0	30.6
39,000	602D393F100DJ2D	3.000 x 8.625	5.4	46.0
160 VOLTS DC WORKING; 200 VOLTS DC SURGE				
270	602D271F160AN2A	1.375 x 1.625	359.0	1.8
470	602D471F160AA2A	1.375 x 2.125	210.0	2.6
560	602D561F160AM2A	1.375 x 2.625	149.0	3.3
820	602D821F160AB2A	1.375 x 3.125	117.0	4.1
1,000	602D102F160AL2A	1.375 x 3.625	98.0	4.7
1,200	602D122F160AC2A	1.375 x 4.125	82.0	5.5
1,500	602D152F160AE2A	1.375 x 5.125	67.0	6.7

STANDARD RATINGS

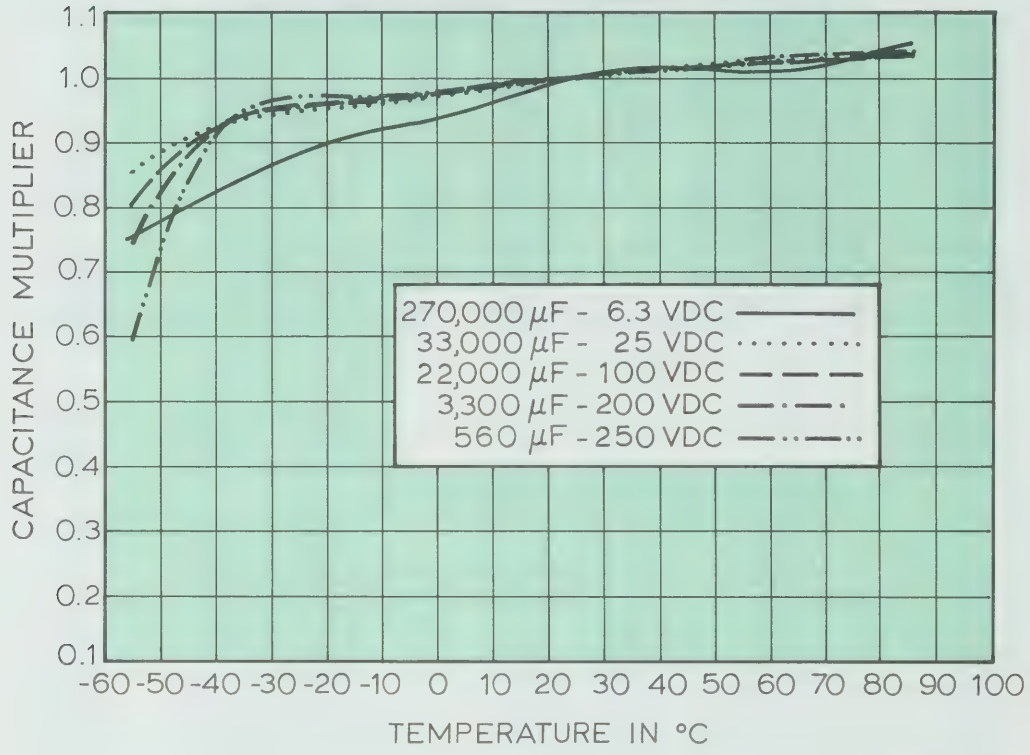
μF	Catalog Number	Nominal Case Size (inches) D x L	Max. ESR 120Hz, +25°C (mΩ)	Max. Ripple Current 120Hz, +85°C (A)
160 VOLTS DC WORKING; 200 VOLTS DC SURGE (Cont.)				
560	602D561F160BY2A	2.000 x 1.875	159.0	3.6
820	602D821F160BA2A	2.000 x 2.125	119.0	4.4
1,200	602D122F160BM2A	2.000 x 2.625	82.0	5.7
1,500	602D152F160BB2A	2.000 x 3.125	62.0	7.0
1,800	602D182F160BL2A	2.000 x 3.625	50.0	8.3
2,200	602D222F160BC2A	2.000 x 4.125	42.0	9.5
2,700	602D272F160BD2A	2.000 x 4.625	35.0	10.9
3,300	602D332F160BF2A	2.000 x 5.625	28.0	13.2
2,700	602D272F160CB2A	2.500 x 3.125	37.0	10.6
3,900	602D392F160CC2A	2.500 x 4.125	25.0	14.2
4,700	602D472F160CD2A	2.500 x 4.625	22.0	16.0
5,600	602D562F160CF2A	2.500 x 5.625	17.2	19.4
4,700	602D472F160DL2A	3.000 x 3.625	22.0	16.4
5,600	602D562F160DC2A	3.000 x 4.125	18.3	18.6
6,800	602D682F160DD2A	3.000 x 4.625	16.0	20.8
8,200	602D822F160DE2A	3.000 x 5.125	14.3	22.8
15,000	602D153F160DJ2D	3.000 x 8.625	9.5	34.7
200 VOLTS DC WORKING; 250 VOLTS DC SURGE				
220	602D221F200AN2A	1.375 x 1.625	516.0	1.5
330	602D331F200AA2A	1.375 x 2.125	304.0	2.1
470	602D471F200AM2A	1.375 x 2.625	220.0	3.7
560	602D561F200AB2A	1.375 x 3.125	171.0	3.4
820	602D821F200AL2A	1.375 x 3.625	140.0	4.0
1,000	602D102F200AD2A	1.375 x 4.625	104.0	5.1
1,200	602D122F200AE2A	1.375 x 5.125	95.0	5.6
470	602D471F200BY2A	2.000 x 1.875	234.0	3.0
560	602D561F200BA2A	2.000 x 2.125	175.0	3.6
1,000	602D102F200BM2A	2.000 x 2.625	116.0	4.8
1,200	602D122F200BB2A	2.000 x 3.125	88.0	5.9
1,500	602D152F200BL2A	2.000 x 3.625	72.0	6.9
1,800	602D182F200BC2A	2.000 x 4.125	61.0	7.9
2,200	602D222F200BD2A	2.000 x 4.625	51.0	9.1
2,700	602D272F200BF2A	2.000 x 5.625	41.0	11.0
2,200	602D222F200CB2A	2.500 x 3.125	53.0	8.8
3,300	602D332F200CC2A	2.500 x 4.125	35.0	12.0
3,900	602D392F200CD2A	2.500 x 4.625	31.0	13.4
4,700	602D472F200CF2A	2.500 x 5.625	24.0	16.3
3,900	602D392F200DL2A	3.000 x 3.625	30.0	13.8
4,700	602D472F200DC2A	3.000 x 4.125	25.0	15.8
5,600	602D562F200DD2A	3.000 x 4.625	22.0	17.8
6,800	602D682F200DE2A	3.000 x 5.125	19.5	19.6
12,000	602D123F200DJ2D	3.000 x 8.625	12.7	30.0
250 VOLTS DC WORKING; 300 VOLTS DC SURGE				
180	602D181F250AN2A	1.375 x 1.625	552.0	1.4
270	602D271F250AA2A	1.375 x 2.125	324.0	2.1
390	602D391F250AM2A	1.375 x 2.625	231.0	2.7
560	602D561F250AB2A	1.375 x 3.125	182.0	3.2
680	602D681F250AL2A	1.375 x 3.625	149.0	3.8
820	602D821F250AC2A	1.375 x 4.125	126.0	4.4
1,000	602D102F250AE2A	1.375 x 5.125	105.0	5.3
1,200	602D122F250AF2A	1.375 x 5.625	89.0	6.0
390	602D391F250BY2A	2.000 x 1.875	252.0	2.9
560	602D561F250BA2A	2.000 x 2.125	185.0	3.5
820	602D821F250BM2A	2.000 x 2.625	124.0	4.7
1,000	602D102F250BB2A	2.000 x 3.125	96.0	5.7
1,200	602D122F250BL2A	2.000 x 3.625	76.0	6.7
1,500	602D152F250BC2A	2.000 x 4.125	63.0	7.8
1,800	602D182F250BD2A	2.000 x 4.625	54.0	8.8
2,200	602D222F250BF2A	2.000 x 5.625	43.0	10.7

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size (inches) D x L	Max. ESR 120Hz, +25°C (mΩ)	Max. Ripple Current 120Hz, +85°C (A)
250 VOLTS DC WORKING; 300 VOLTS DC SURGE (Cont.)				
1,800	602D182F250CB2A	2.500 x 3.125	56.0	8.5
2,700	602D272F250CC2A	2.500 x 4.125	38.0	11.5
3,300	602D332F250CD2A	2.500 x 4.625	33.0	13.0
3,900	602D392F250CF2A	2.500 x 5.625	26.0	15.9
3,300	602D332F250DL2A	3.000 x 3.625	32.0	13.5
3,900	602D392F250DC2A	3.000 x 4.125	27.0	15.4
4,700	602D472F250DD2A	3.000 x 4.625	23.0	17.3
5,600	602D562F250DE2A	3.000 x 5.125	21.0	19.1
6,800	602D682F250DF2A	3.000 x 5.625	18.3	20.9
10,000	602D103F250DJ2A	3.000 x 8.625	12.8	29.9

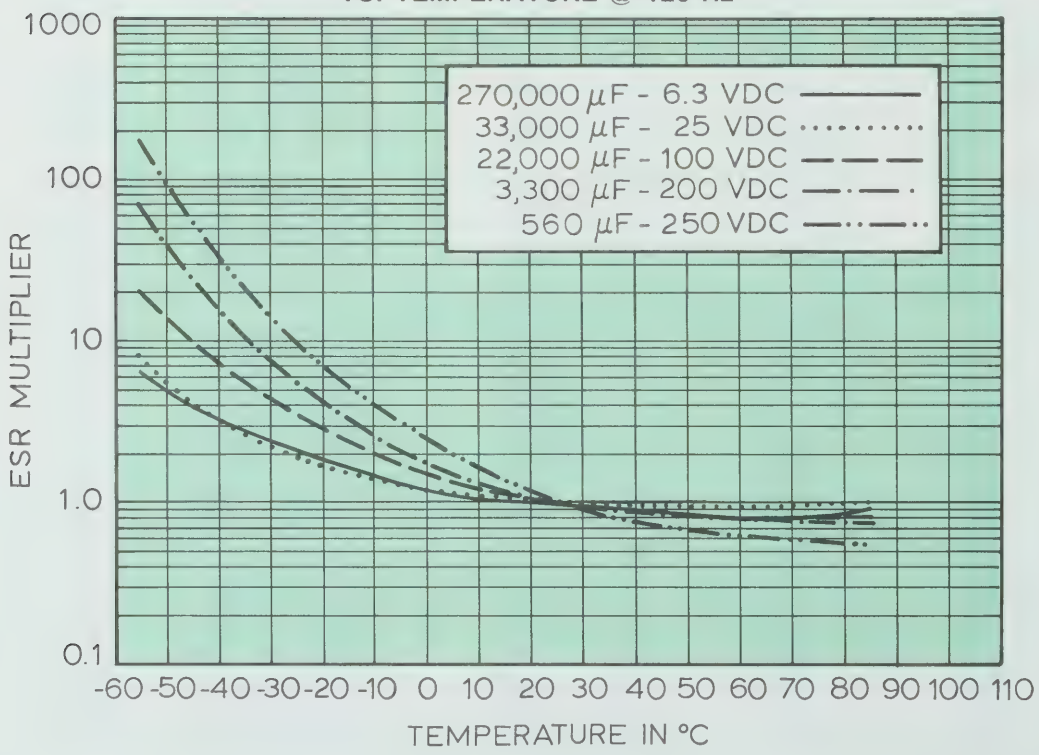
TYPICAL CURVES

TYPE 602D — TYPICAL CAPACITANCE MULTIPLIER
VS. TEMPERATURE @ 120 Hz



Dwg. No. A-14,725

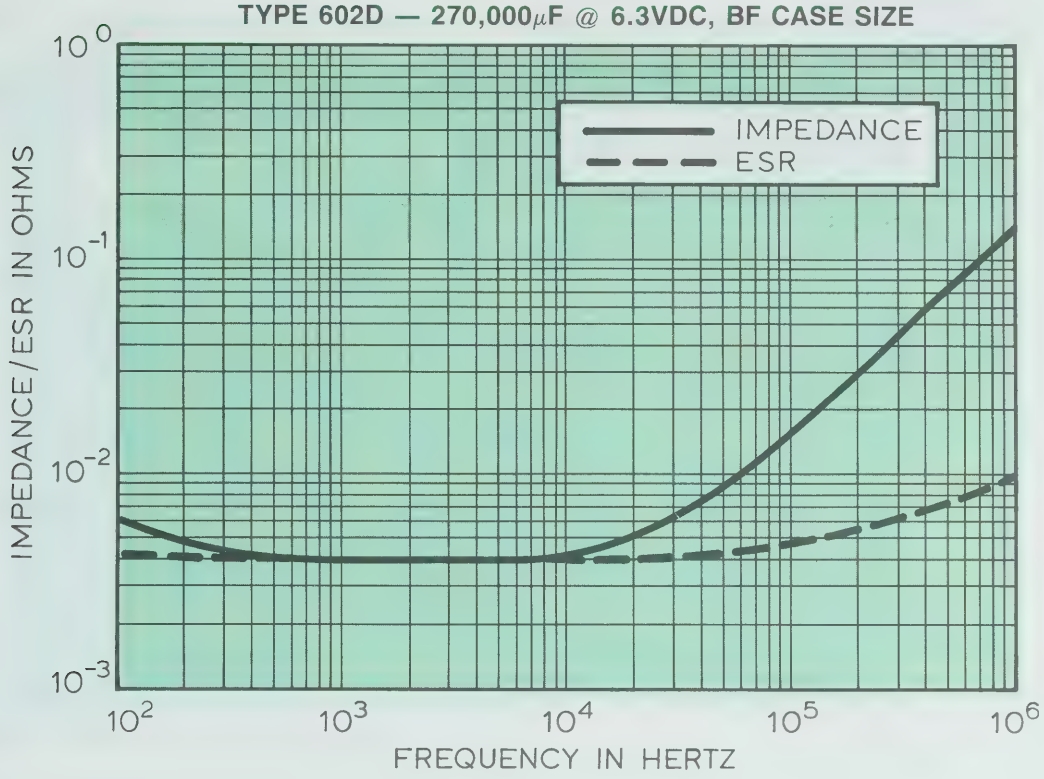
TYPE 602D — TYPICAL ESR MULTIPLIER
VS. TEMPERATURE @ 120 Hz



Dwg. No. A-14,716

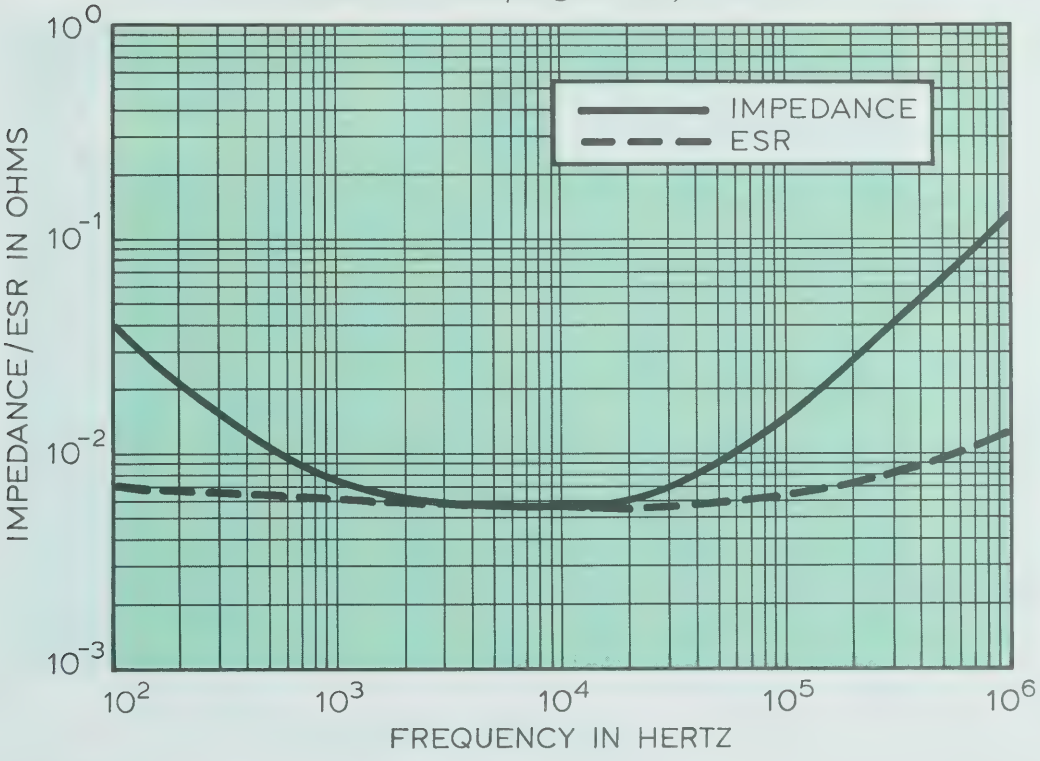
TYPICAL CURVES @ +25°C

TYPE 602D — 270,000μF @ 6.3VDC, BF CASE SIZE



Dwg. No. A-14,649

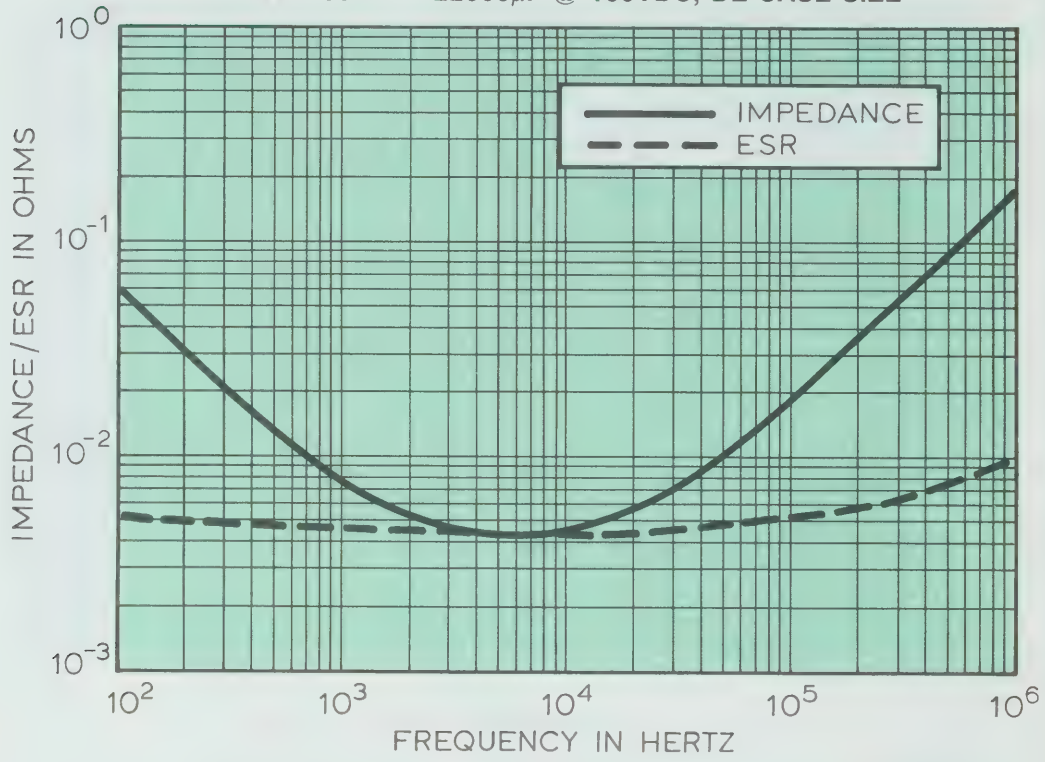
TYPE 602D — 33000μF @ 25VDC, BB CASE SIZE



Dwg. No. A-14,652

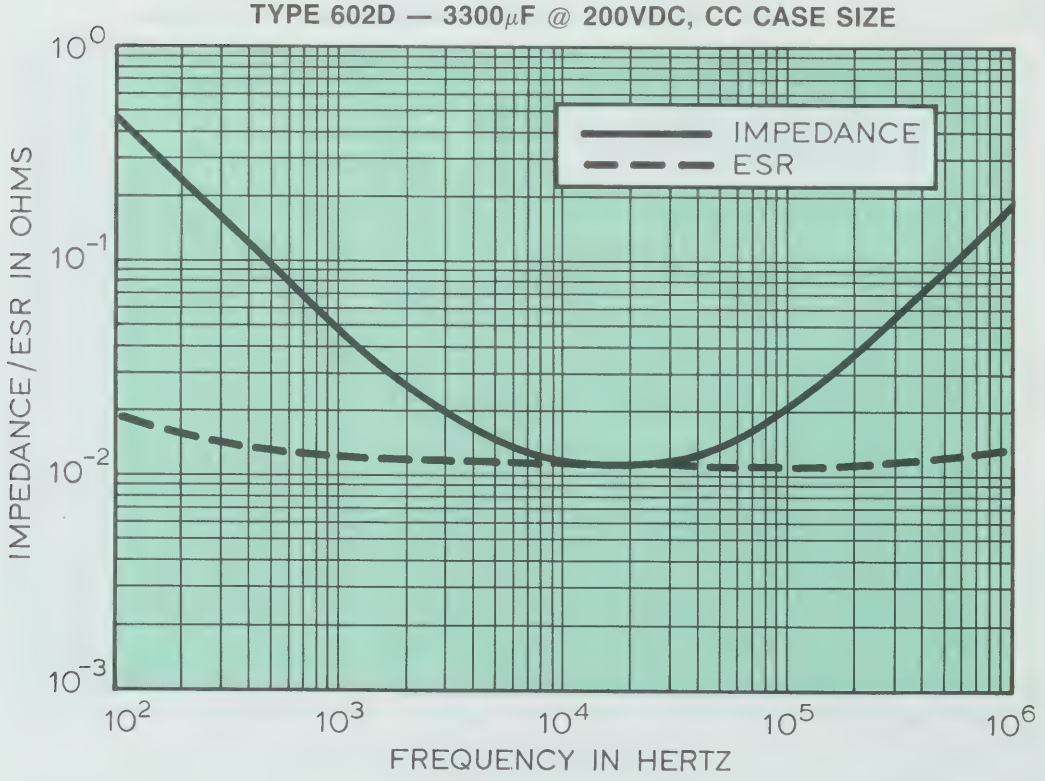
TYPICAL CURVES @ +25°C

TYPE 602D — 22000μF @ 100VDC, DE CASE SIZE



Dwg. No. A-14,651

TYPE 602D — 3300μF @ 200VDC, CC CASE SIZE



Dwg. No. A-14,650

+95°C Large Can Aluminum Capacitors

L65-19

Features —

- **Ideal for High Frequency SMPS Output Filtering**
- **Symmetrical ESR (±30%) and Capacitance (±20%)**
- **Excellent Ripple Current Capability**
- **Metric Threads and Stud Mount Available**

General Specifications —

Operating Temperature: –55°C to +95°C.

Voltage Range: 5 - 60 VDC.

Capacitance Range: 2300μF - 180,000μF.

Capacitance Tolerance: ±20%.

Case Size Range: 1.375″ x 2.125″ - 2.0″ x 5.625″.

Termination: Screw inserts or Solderable Terminals.

Life Validation Test: 1000 hours at +95°C or 2000 hours at +85°C:
- Δ CAP ≤ 15% from initial measurement.
- Δ ESR ≤ 1.3 x initial specified limit.
- Δ DCL ≤ initial specified limit.

Shelf Test: 500 hours at +95°C:
- Δ CAP ≤ 10% from initial measurement.
- Δ ESR ≤ 1.2 x initial specified limit.
- Δ DCL ≤ 2.0 x initial specified limit.

DC Leakage Current: after 5 min. charge.
$I = 4.0\sqrt{CV}$ @ +25°C
C in μF, V in Volts, I in μA

Ripple Current Multipliers:

TEMPERATURE

Ambient Temperature	Multipliers
+85°C	1.0
+75°C	1.4
+65°C	1.7
+55°C & below	2.0

FREQUENCY Hz

Rated WVDC	120	400	1K	5K-100K
5-20	.85	.95	.95	1.0
28-60	.75	.85	.95	1.0

Low Temperature Performance:

Capacitance Ratio $C^{-55°C}/C^{+25°C}$ min. @ 120Hz

Rated Voltage (VDC)	Capacitance Remaining
0 to 9	10
10 to 40	8
41 to 60	6

ESR Ratio $ESR^{-55°C}/ESR^{+25°C}$ max. @ 120Hz

Rated Voltage (VDC)	Multiplier
0 to 9	3
10 to 40	2.5
41 to 60	2

Performance Characteristics —

SEE PAGE 2.

Catalog Numbering System

622D 223 M 005 AA 2 A

LEAD CODE
A = LOW SCREW INSERT (Standard)
B = HIGH SCREW INSERT
I = HIGH INSERT M5 SCREW THREAD
P = KEYED POLARITY VERTICAL MOUNT

CASE STYLE
2 = PLASTIC FILM INSULATING SLEEVE
5 = PLASTIC FILM INSULATING SLEEVE WITH POLYMER COATED END SEAL*

CASE CODE. SEE DIMENSIONS.

DC VOLTAGE RATING. EXPRESSED IN VOLTS. "R" INDICATES A DECIMAL POINT, FOR EXAMPLE, 7R5 = 7.5 VOLTS.

CAPACITANCE TOLERANCE. M = ±20%.

CAPACITANCE. EXPRESSED IN MICROFARADS. THE FIRST TWO DIGITS ARE SIGNIFICANT FIGURES, THE THIRD IS THE NUMBER OF ZEROS.

TYPE NUMBER. IDENTIFIES THE BASIC CAPACITOR DESIGN.

*Available with Terminal "P" only.

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size (inches) D x L	Max. Ripple Current @ +85°C, 20kHz (A)	ESR ±30% @ +25°C, 20kHz (mΩ)
5 VOLTS DC WORKING; 6 VOLTS DC SURGE				
22,000	622D223M005AA2A	1.375 x 2.125	9.8	5.8
31,000	622D313M005AM2A	1.375 x 2.625	11.4	5.0
40,000	622D403M005AB2A	1.375 x 3.125	13.0	4.5
50,000	622D503M005AL2A	1.375 x 3.625	14.4	4.1
51,000	622D513M005BA2A	2.000 x 2.125	14.0	4.6
59,000	622D593M005AC2A	1.375 x 4.125	15.8	3.8
61,000	622D613M005BM2A	2.000 x 2.625	16.2	4.0
68,000	622D683M005AD2A	1.375 x 4.625	17.3	3.5
77,000	622D773M005AE2A	1.375 x 5.125	19.0	3.2
82,000	622D823M005BB2A	2.000 x 3.125	19.0	3.3
86,000	622D863M005AF2A	1.375 x 5.625	20.4	3.0
100,000	622D104M005BL2A	2.000 x 3.625	21.5	2.9
120,000	622D124M005BC2A	2.000 x 4.125	23.9	2.6
140,000	622D144M005BD2A	2.000 x 4.625	26.1	2.4
160,000	622D164M005BE2A	2.000 x 5.125	27.8	2.3
180,000	622D184M005BF2A	2.000 x 5.625	29.6	2.2
6.3 VOLTS DC WORKING; 8 VOLTS DC SURGE				
19,000	622D193M6R3AA2A	1.375 x 2.125	9.3	6.5
27,000	622D273M6R3AM2A	1.375 x 2.625	11.2	5.1
34,000	622D343M6R3AB2A	1.375 x 3.125	13.0	4.5
42,000	622D423M6R3AL2A	1.375 x 3.625	14.4	4.1
43,000	622D433M6R3BA2A	2.000 x 2.125	14.2	4.5
50,000	622D503M6R3AC2A	1.375 x 4.125	15.8	3.8
52,000	622D523M6R3BM2A	2.000 x 2.625	16.4	3.9
57,000	622D573M6R3AD2A	1.375 x 4.625	17.3	3.5
65,000	622D653M6R3AE2A	1.375 x 5.125	19.0	3.2
70,000	622D703M6R3BB2A	2.000 x 3.125	19.3	3.2
73,000	622D733M6R3AF2A	1.375 x 5.625	20.4	3.0
87,000	622D873M6R3BL2A	2.000 x 3.625	21.9	2.8
100,000	622D104M6R3BC2A	2.000 x 4.125	23.9	2.6
110,000	622D114M6R3BD2A	2.000 x 4.625	26.1	2.4
140,000	622D144M6R3BE2A	2.000 x 5.125	28.4	2.2
150,000	622D154M6R3BF2A	2.000 x 5.625	30.0	2.1
7.5 VOLTS DC WORKING; 9 VOLTS DC SURGE				
18,000	622D183M7R5AA2A	1.375 x 2.125	9.6	6.0
25,000	622D253M7R5AM2A	1.375 x 2.625	11.2	5.2
32,000	622D323M7R5AB2A	1.375 x 3.125	12.8	4.6
39,000	622D393M7R5AL2A	1.375 x 3.625	14.2	4.2
40,000	622D403M7R5BA2A	2.000 x 2.125	14.2	4.5
46,000	622D463M7R5AC2A	1.375 x 4.125	15.6	3.9
48,000	622D483M7R5BM2A	2.000 x 2.625	16.2	4.0
53,000	622D533M7R5AD2A	1.375 x 4.625	17.1	3.6
61,000	622D613M7R5AE2A	1.375 x 5.125	18.7	3.3
65,000	622D653M7R5BB2A	2.000 x 3.125	19.2	3.3
68,000	622D683M7R5AF2A	1.375 x 5.625	20.4	3.0
81,000	622D813M7R5BL2A	2.000 x 3.625	21.5	2.9
97,000	622D973M7R5BC2A	2.000 x 4.125	23.5	2.7
110,000	622D114M7R5BD2A	2.000 x 4.625	25.6	2.5
130,000	622D134M7R5BE2A	2.000 x 5.125	27.8	2.3
140,000	622D144M7R5BF2A	2.000 x 5.625	29.6	2.2

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size (inches) D x L	Max. Ripple Current @ +85°C, 20kHz (A)	ESR ±30% @ +25°C, 20kHz (mΩ)
10 VOLTS DC WORKING; 12 VOLTS DC SURGE				
16,000	622D163M010AA2A	1.375 x 2.125	8.6	7.6
22,000	622D223M010AM2A	1.375 x 2.625	10.4	6.1
28,000	622D283M010AB2A	1.375 x 3.125	12.1	5.2
35,000	622D353M010AL2A	1.375 x 3.625	13.7	4.6
36,000	622D363M010BA2A	2.000 x 2.125	14.0	4.6
41,000	622D413M010AC2A	1.375 x 4.125	14.9	4.3
43,000	622D433M010BM2A	2.000 x 2.625	16.2	4.0
48,000	622D483M010AD2A	1.375 x 4.625	16.3	4.0
54,000	622D543M010AE2A	1.375 x 5.125	17.7	3.7
58,000	622D583M010BB2A	2.000 x 3.125	18.8	3.4
60,000	622D603M010AF2A	1.375 x 5.625	19.0	3.5
72,000	622D723M010BL2A	2.000 x 3.625	21.1	3.0
86,000	622D863M010BC2A	2.000 x 4.125	23.5	2.7
100,000	622D104M010BD2A	2.000 x 4.625	25.6	2.5
110,000	622D114M010BE2A	2.000 x 5.125	27.8	2.3
130,000	622D134M010BF2A	2.000 x 5.625	28.9	2.3
16 VOLTS DC WORKING; 18 VOLTS DC SURGE				
12,000	622D123M016AA2A	1.375 x 2.125	9.3	6.4
18,000	622D183M016AM2A	1.375 x 2.625	10.9	5.5
23,000	622D233M016AB2A	1.375 x 3.125	12.4	4.9
28,000	622D283M016AL2A	1.375 x 3.625	13.9	4.4
29,000	622D293M016BA2A	2.000 x 2.125	14.0	4.6
33,000	622D333M016AC2A	1.375 x 4.125	15.4	4.0
34,000	622D343M016BM2A	2.000 x 2.625	16.2	4.0
38,000	622D383M016AD2A	1.375 x 4.625	16.9	3.7
43,000	622D433M016AE2A	1.375 x 5.125	18.4	3.4
46,000	622D463M016BB2A	2.000 x 3.125	18.8	3.4
48,000	622D483M016AF2A	1.375 x 5.625	20.1	3.1
58,000	622D583M016BL2A	2.000 x 3.625	21.5	2.9
69,000	622D693M016BC2A	2.000 x 4.125	23.5	2.7
81,000	622D813M016BD2A	2.000 x 4.625	25.6	2.5
92,000	622D923M016BE2A	2.000 x 5.125	27.8	2.3
100,000	622D104M016BF2A	2.000 x 5.625	29.6	2.2
20 VOLTS DC WORKING; 22 VOLTS DC SURGE				
10,000	622D103M020AA2A	1.375 x 2.125	9.1	6.6
15,000	622D153M020AM2A	1.375 x 2.625	10.7	5.7
19,000	622D193M020AB2A	1.375 x 3.125	12.3	5.0
23,000	622D233M020AL2A	1.375 x 3.625	13.8	4.5
24,000	622D243M020BA2A	2.000 x 2.125	14.0	4.6
27,000	622D273M020AC2A	1.375 x 4.125	15.3	4.1
29,000	622D293M020BM2A	2.000 x 2.625	16.2	4.0
32,000	622D323M020AD2A	1.375 x 4.625	16.6	3.8
36,000	622D363M020AE2A	1.375 x 5.125	18.1	3.5
38,000	622D383M020BB2A	2.000 x 3.125	18.8	3.4
40,000	622D403M020AF2A	1.375 x 5.625	19.8	3.2
48,000	622D483M020BL2A	2.000 x 3.625	21.5	2.9
57,000	622D573M020BC2A	2.000 x 4.125	23.5	2.7
67,000	622D673M020BD2A	2.000 x 4.625	25.6	2.5
76,000	622D763M020BE2A	2.000 x 5.125	27.8	2.3
86,000	622D863M020BF2A	2.000 x 5.625	29.6	2.2

STANDARD RATINGS

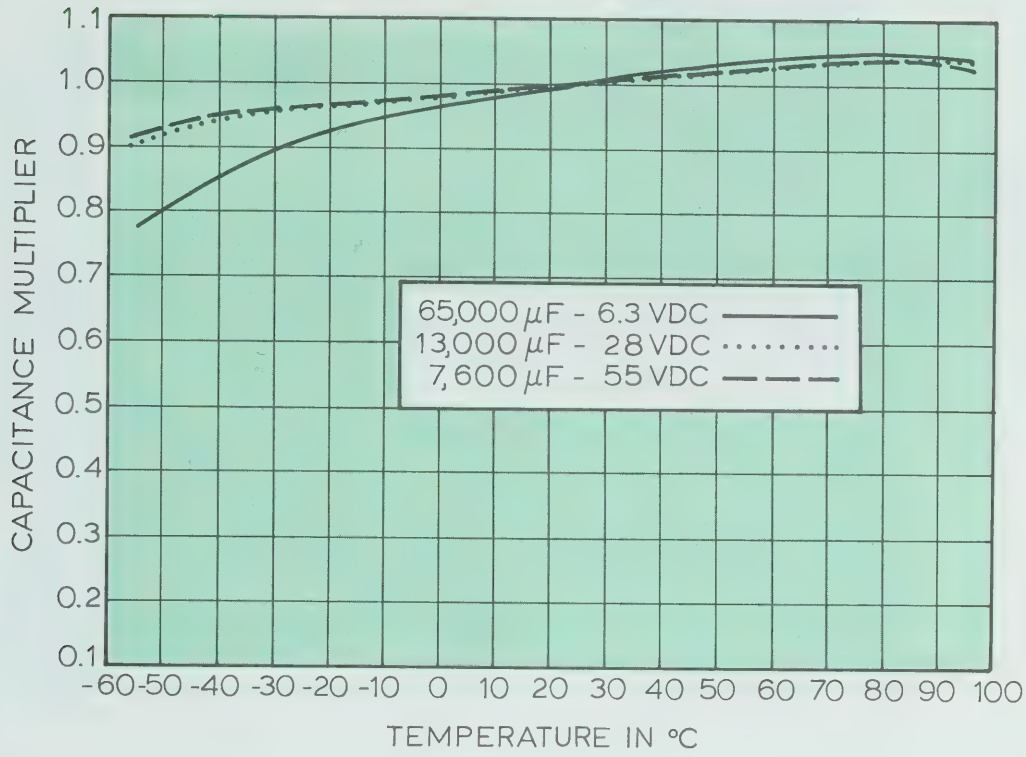
μF	Catalog Number	Nominal Case Size (inches) D x L	Max. Ripple Current @ +85°C, 20kHz (A)	ESR ±30% @ +25°C, 20kHz (mΩ)
28 VOLTS DC WORKING; 32 VOLTS DC SURGE				
7,400	622D742M028AA2A	1.375 x 2.125	8.8	7.1
10,000	622D103M028AM2A	1.375 x 2.625	10.4	6.1
13,000	622D133M028AB2A	1.375 x 3.125	11.9	5.3
16,000	622D163M028AL2A	1.375 x 3.625	13.3	4.8
17,000	622D173M028BA2A	2.000 x 2.125	14.0	4.6
19,000	622D193M028AC2A	1.375 x 4.125	14.9	4.3
20,000	622D203M028BM2A	2.000 x 2.625	16.2	4.0
22,000	622D223M028AD2A	1.375 x 4.625	16.4	3.9
25,000	622D253M028AE2A	1.375 x 5.125	17.9	3.6
27,000	622D273M028BB2A	2.000 x 3.125	18.8	3.4
28,000	622D283M028AF2A	1.375 x 5.625	19.5	3.3
34,000	622D343M028BL2A	2.000 x 3.625	21.1	3.0
40,000	622D403M028BC2A	2.000 x 4.125	23.5	2.7
47,000	622D473M028BD2A	2.000 x 4.625	25.6	2.5
54,000	622D543M028BE2A	2.000 x 5.125	27.8	2.3
61,000	622D613M028BF2A	2.000 x 5.625	29.6	2.2
35 VOLTS DC WORKING; 40 VOLTS DC SURGE				
5,800	622D582M035AA2A	1.375 x 2.125	8.6	7.5
8,200	622D822M035AM2A	1.375 x 2.625	10.1	6.4
10,000	622D103M035AB2A	1.375 x 3.125	11.7	5.5
13,000	622D133M035AL2A	1.375 x 3.625	13.1	5.0
13,000	622D133M035BA2A	2.000 x 2.125	14.0	4.6
15,000	622D153M035AC2A	1.375 x 4.125	14.6	4.5
16,000	622D163M035BM2A	2.000 x 2.625	16.2	4.0
17,000	622D173M035AD2A	1.375 x 4.625	16.0	4.1
20,000	622D203M035AE2A	1.375 x 5.125	17.7	3.7
21,000	622D213M035BB2A	2.000 x 3.125	18.5	3.5
22,000	622D223M035AF2A	1.375 x 5.625	19.2	3.4
26,000	622D263M035BL2A	2.000 x 3.625	20.8	3.1
31,000	622D313M035BC2A	2.000 x 4.125	23.5	2.7
37,000	622D373M035BD2A	2.000 x 4.625	25.6	2.5
42,000	622D423M035BE2A	2.000 x 5.125	27.8	2.3
47,000	622D473M035BF2A	2.000 x 5.625	29.6	2.2
45 VOLTS DC WORKING; 50 VOLTS DC SURGE				
4,200	622D422M045AA2A	1.375 x 2.125	8.4	7.9
5,800	622D582M045AM2A	1.375 x 2.625	10.3	6.2
7,500	622D752M045AB2A	1.375 x 3.125	12.0	5.3
9,200	622D922M045AL2A	1.375 x 3.625	13.5	4.7
9,500	622D952M045BA2A	2.000 x 2.125	14.0	4.6
11,000	622D113M045AC2A	1.375 x 4.125	14.9	4.3
11,000	622D113M045BM2A	2.000 x 2.625	16.4	3.9
12,000	622D123M045AD2A	1.375 x 4.625	16.3	4.0
14,000	622D143M045AE2A	1.375 x 5.125	17.7	3.7
15,000	622D153M045BB2A	2.000 x 3.125	18.8	3.4
16,000	622D163M045AF2A	1.375 x 5.625	18.7	3.6
19,000	622D193M045BL2A	2.000 x 3.625	21.5	2.9
22,000	622D223M045BC2A	2.000 x 4.125	23.9	2.6
26,000	622D263M045BD2A	2.000 x 4.625	25.6	2.5
30,000	622D303M045BE2A	2.000 x 5.125	27.2	2.4
34,000	622D343M045BF2A	2.000 x 5.625	28.9	2.3

STANDARD RATINGS

μF	Catalog Number	Nominal Case Size (inches) D x L	Max. Ripple Current @ +85°C, 20kHz (A)	ESR ±30% @ +25°C, 20kHz (mΩ)
55 VOLTS DC WORKING; 64 VOLTS DC SURGE				
3,400	622D342M055AA2A	1.375 x 2.125	8.0	8.7
4,800	622D482M055AM2A	1.375 x 2.625	9.5	7.3
6,200	622D622M055AB2A	1.375 x 3.125	11.0	6.3
7,600	622D762M055AL2A	1.375 x 3.625	12.3	5.6
7,700	622D772M055BA2A	2.000 x 2.125	14.0	4.6
8,900	622D892M055AC2A	1.375 x 4.125	13.8	5.0
9,200	622D922M055BM2A	2.000 x 2.625	16.2	4.0
10,000	622D103M055AD2A	1.375 x 4.625	15.3	4.5
11,000	622D113M055AE2A	1.375 x 5.125	17.0	4.0
12,000	622D123M055BB2A	2.000 x 3.125	18.5	3.5
14,000	622D143M055AF2A	1.375 x 5.625	18.7	3.6
15,000	622D153M055BL2A	2.000 x 3.625	20.8	3.1
18,000	622D183M055BC2A	2.000 x 4.125	23.5	2.7
21,000	622D213M055BD2A	2.000 x 4.625	25.6	2.5
24,000	622D243M055BE2A	2.000 x 5.125	27.2	2.4
27,000	622D273M055BF2A	2.000 x 5.625	28.9	2.3
60 VOLTS DC WORKING; 70 VOLTS DC SURGE				
2,300	622D232M060AA2A	1.375 x 2.125	8.1	8.6
3,300	622D332M060AM2A	1.375 x 2.625	9.9	6.8
4,200	622D422M060AB2A	1.375 x 3.125	11.4	5.9
5,100	622D512M060AL2A	1.375 x 3.625	12.9	5.2
5,300	622D532M060BA2A	2.000 x 2.125	13.9	4.7
6,100	622D612M060AC2A	1.375 x 4.125	14.5	4.9
6,400	622D642M060BM2A	2.000 x 2.625	16.0	4.1
7,100	622D712M060AD2A	1.375 x 4.625	15.3	4.5
8,000	622D802M060AE2A	1.375 x 5.125	16.8	4.1
8,500	622D852M060BB2A	2.000 x 3.125	18.5	3.5
9,000	622D902M060AF2A	1.375 x 5.625	17.8	4.0
10,000	622D103M060BL2A	2.000 x 3.625	20.5	3.2
12,000	622D123M060BC2A	2.000 x 4.125	22.6	2.9
15,000	622D153M060BD2A	2.000 x 4.625	24.6	2.7
17,000	622D173M060BE2A	2.000 x 5.125	26.1	2.6
19,000	622D193M060BF2A	2.000 x 5.625	28.3	2.4

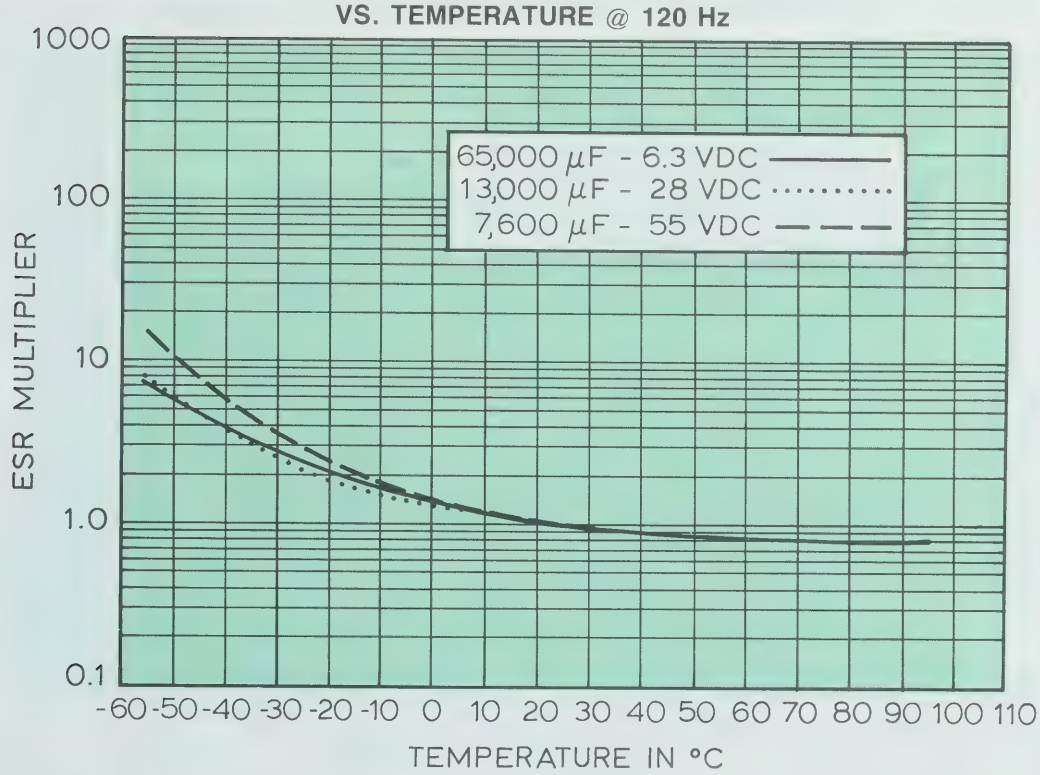
TYPICAL CURVES

TYPE 622D — TYPICAL CAPACITANCE MULTIPLIER VS. TEMPERATURE @ 120 Hz



Dwg. No. A-14,724

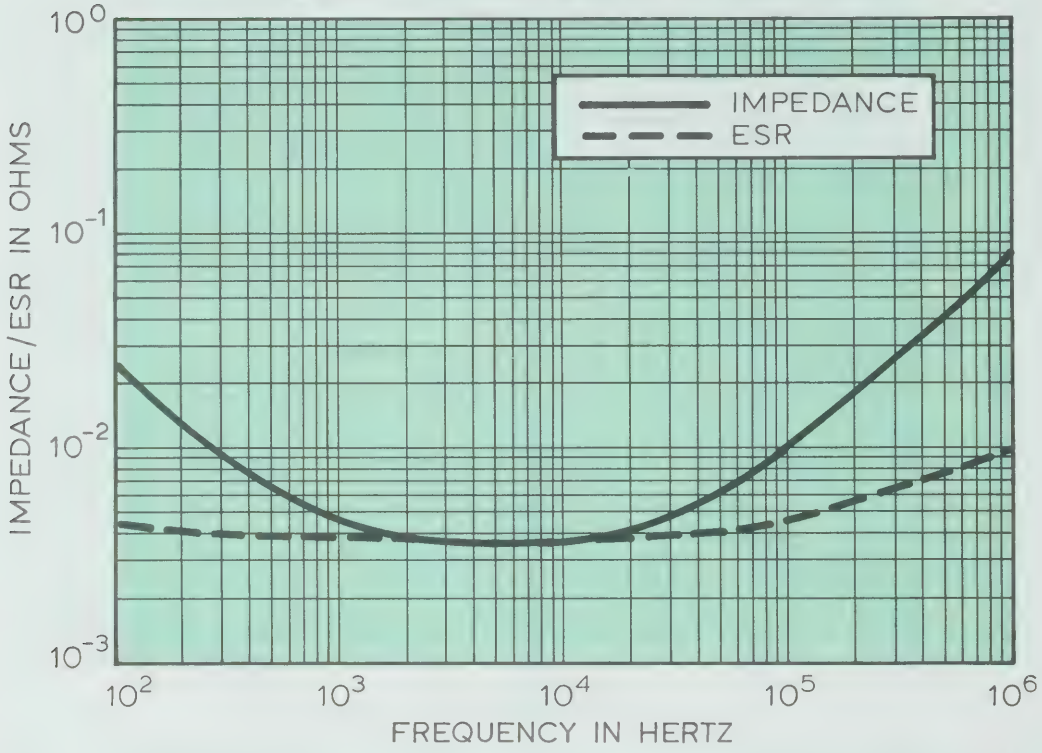
TYPE 622D — TYPICAL ESR MULTIPLIER VS. TEMPERATURE @ 120 Hz



Dwg. No. A-14,717

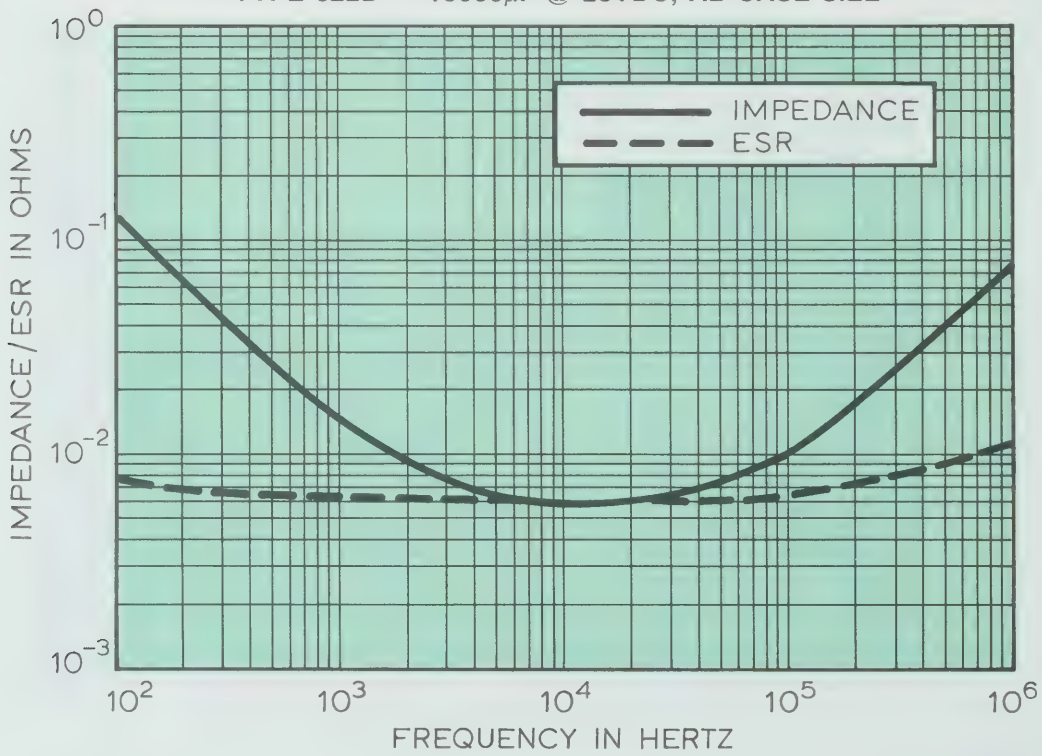
TYPICAL CURVES @ +25°C

TYPE 622D — 65000μF @ 6.3VDC, AE CASE SIZE



Dwg. No. A-14,678

TYPE 622D — 13000μF @ 28VDC, AB CASE SIZE



Dwg. No. A-14,679

+105°C Large Can Aluminum Capacitors

L65-18

Features —

- Long Life and Stability
- Ideal for High Frequency SMPS Output Filtering
- Symmetrical ESR (±30%) and Capacitance (±20%)
- High Ripple Current Capability
- Low ESR

General Specifications —

Operating Temperature: −55°C to +105°C.

Voltage Range: 6.3 - 35 VDC.

Capacitance Range: 4800μF - 310,000μF.

Capacitance Tolerance: ±20%.

Case Size Range: 1.375″ x 1.625″ - 2.0″ x 5.625″.

Termination: Screw insert or Solderable Terminals.

Life Validation Test: 2000 hours at +105°C:
Δ CAP ≤ 20% from initial measurement.
Δ ESR ≤ 1.5 x initial specified limit.
Δ DCL ≤ initial specified limit.

Shelf Test: 1000 hours at +105°C:
Δ CAP ≤ 15% from initial measurement.
Δ ESR ≤ 1.3 x initial specified limit.
Δ DCL ≤ 2.0 x initial specified limit.

DC Leakage Current: 5 min. charge time.
$I = 4.0\sqrt{CV}$ @ +25°C
C in μF, V in Volts, I in μA

Ripple Current Multipliers:

TEMPERATURE

Ambient Temperature	Multipliers
+105°C	0.5
+85°C	1.0
+65°C	1.4
+45°C	1.7
+25°C	2.0

FREQUENCY Hz

Rated WVDC	120	400	1K	5K-100K
6.3-35	.90	.95	.98	1.0

Low Temperature Performance:

Capacitance Ratio $C^{-55°C}/C^{+25°C}$ min. @ 120Hz

Rated Voltage (VDC)	Capacitance Remaining
6.3 - 35	0.8

Impedance Ratio $Z^{-55°C}/Z^{+25°C}$ max. @ 120Hz

Frequency	Multiplier
120Hz	3
20k - 100kHz	30

Performance Characteristics —

SEE PAGE 2.

Catalog Numbering System

747D 383 M 6R3 AA 2 A

LEAD CODE
A = LOW SCREW INSERT (Standard)
B = HIGH SCREW INSERT
I = HIGH INSERT M5 SCREW THREAD
P = KEYED POLARITY VERTICAL MOUNT

CASE STYLE
2 = PLASTIC FILM INSULATING SLEEVE
5 = PLASTIC FILM INSULATING SLEEVE WITH POLYMER COATED END SEAL*

CASE CODE. SEE DIMENSIONS.

DC VOLTAGE RATING. EXPRESSED IN VOLTS. "R" INDICATES A DECIMAL POINT, FOR EXAMPLE, 6R3 = 6.3 VOLTS.

CAPACITANCE TOLERANCE. M = ±20%.

CAPACITANCE. EXPRESSED IN MICROFARADS. THE FIRST TWO DIGITS ARE SIGNIFICANT FIGURES, THE THIRD IS THE NUMBER OF ZEROS.

TYPE NUMBER. IDENTIFIES THE BASIC CAPACITOR DESIGN.

*Available with Terminal "P" only.

STANDARD RATINGS

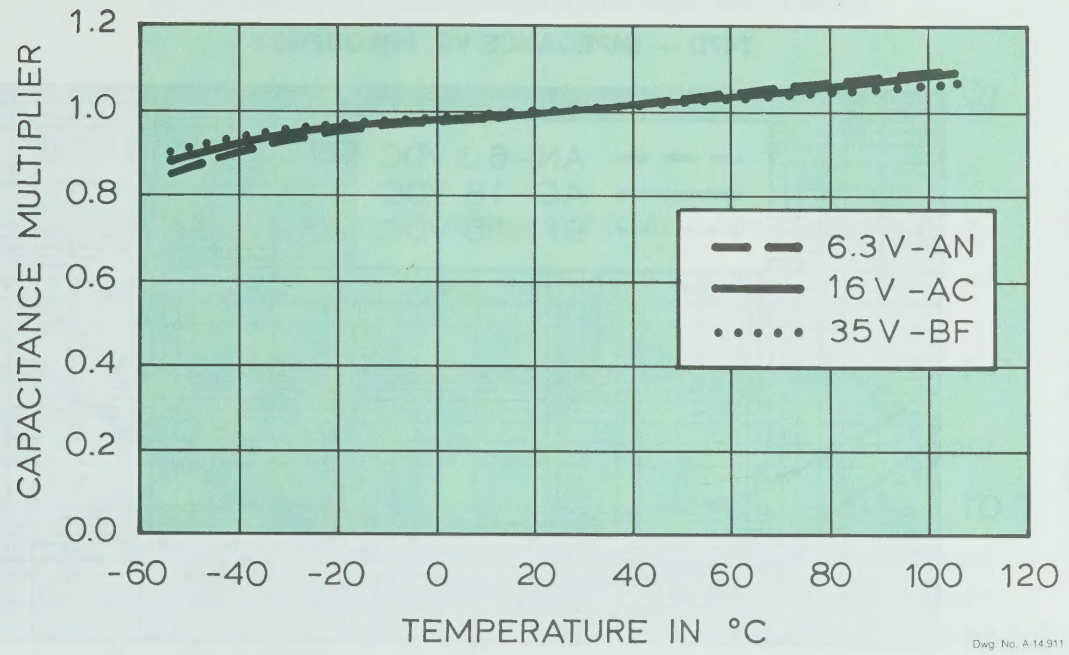
µF	Catalog Number	Nominal Case Size D x L	ESR @ +25°C (mΩ) 120Hz Max.	ESR @ +25°C (mΩ) 20k-40kHz ±30%	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-40kHz
6.3 VOLTS DC WORKING; 8 VOLTS DC SURGE						
23,000	747D233M6R3AN2A	1.375 x 1.625	16.9	9.0	8.4	9.5
31,000	747D313M6R3AY2A	1.375 x 1.875	13.0	7.0	10.1	11.4
38,000	747D383M6R3AA2A	1.375 x 2.125	10.7	5.9	11.6	13.1
54,000	747D543M6R3AM2A	1.375 x 2.625	8.1	4.4	14.5	16.3
69,000	747D693M6R3AB2A	1.375 x 3.125	6.6	3.8	17.2	19.1
85,000	747D853M6R3AL2A	1.375 x 3.625	5.7	3.3	19.7	21.8
87,000	747D873M6R3BA2A	2.000 x 2.125	6.3	3.8	19.3	21.1
100,000	747D104M6R3AC2A	1.375 x 4.125	5.1	3.0	22.0	24.3
100,000	747D104M6R3BM2A	2.000 x 2.625	5.5	3.4	22.2	24.2
110,000	747D114M6R3AD2A	1.375 x 4.625	4.7	2.8	24.3	26.6
130,000	747D134M6R3AE2A	1.375 x 5.125	4.3	2.6	26.4	28.9
130,000	747D134M6R3BB2A	2.000 x 3.125	4.6	2.8	26.0	28.2
140,000	747D144M6R3AF2A	1.375 x 5.625	4.0	2.4	28.4	31.0
170,000	747D174M6R3BL2A	2.000 x 3.625	4.0	2.5	29.5	31.8
200,000	747D204M6R3BC2A	2.000 x 4.125	3.6	2.3	32.6	35.1
240,000	747D244M6R3BD2A	2.000 x 4.625	3.3	2.2	35.6	38.1
270,000	747D274M6R3BE2A	2.000 x 5.125	3.1	2.1	38.3	40.8
310,000	747D314M6R3BF2A	2.000 x 5.625	3.0	2.0	40.9	43.5
10 VOLTS DC WORKING; 13 VOLTS DC SURGE						
18,000	747D183M010AN2A	1.375 x 1.625	17.9	9.0	8.1	9.5
24,000	747D243M010AY2A	1.375 x 1.875	13.7	7.0	9.8	11.3
31,000	747D313M010AA2A	1.375 x 2.125	11.3	5.9	11.3	13.0
43,000	747D433M010AM2A	1.375 x 2.625	8.5	4.4	14.2	16.2
56,000	747D563M010AB2A	1.375 x 3.125	7.0	3.8	16.8	19.0
68,000	747D683M010AL2A	1.375 x 3.625	6.0	3.3	19.2	21.7
70,000	747D703M010BA2A	2.000 x 2.125	6.6	3.8	18.9	21.1
81,000	747D813M010AC2A	1.375 x 4.125	5.3	3.0	21.5	24.2
84,000	747D843M010BM2A	2.000 x 2.625	5.8	3.4	21.7	24.1
93,000	747D933M010AD2A	1.375 x 4.625	4.9	2.8	23.8	26.5
100,000	747D104M010AE2A	1.375 x 5.125	4.5	2.6	25.9	28.7
100,000	747D104M010BB2A	2.000 x 3.125	4.7	2.8	25.6	28.2
110,000	747D114M010AF2A	1.375 x 5.625	4.2	2.4	27.9	30.9
140,000	747D144M010BL2A	2.000 x 3.625	4.1	2.5	29.0	31.7
160,000	747D164M010BC2A	2.000 x 4.125	3.7	2.3	32.2	35.0
190,000	747D194M010BD2A	2.000 x 4.625	3.4	2.2	35.1	38.0
220,000	747D224M010BE2A	2.000 x 5.125	3.2	2.1	37.8	40.8
250,000	747D254M010BF2A	2.000 x 5.625	3.1	2.0	40.4	43.4
16 VOLTS DC WORKING; 20 VOLTS DC SURGE						
12,000	747D123M016AN2A	1.375 x 1.625	20.3	9.0	7.6	9.4
16,000	747D163M016AY2A	1.375 x 1.875	15.5	7.0	9.2	11.2
20,000	747D203M016AA2A	1.375 x 2.125	12.7	5.9	10.7	12.9
29,000	747D293M016AM2A	1.375 x 2.625	9.5	4.4	13.4	16.1
38,000	747D383M016AB2A	1.375 x 3.125	7.7	3.8	15.9	18.9
46,000	747D463M016AL2A	1.375 x 3.625	6.6	3.3	18.3	21.6
47,000	747D473M016BA2A	2.000 x 2.125	7.2	3.8	18.0	21.0
55,000	747D553M016AC2A	1.375 x 4.125	5.9	3.0	20.6	24.0
57,000	747D573M016BM2A	2.000 x 2.625	6.3	3.4	20.8	24.0

STANDARD RATINGS

µF	Catalog Number	Nominal Case Size D x L	ESR @ +25°C (mΩ) 120Hz Max.	ESR @ +25°C (mΩ) 20k-40kHz ±30%	Max. Ripple Current @ +85°C (A) 120Hz	Max. Ripple Current @ +85°C (A) 20k-40kHz
16 VOLTS DC WORKING; 20 VOLTS DC SURGE (Cont.)						
63,000	747D633M016AD2A	1.375 x 4.625	5.3	2.8	22.7	26.4
72,000	747D723M016AE2A	1.375 x 5.125	4.9	2.6	24.8	28.6
76,000	747D763M016BB2A	2.000 x 3.125	5.1	2.8	24.6	28.1
80,000	747D803M016AF2A	1.375 x 5.625	4.6	3.2	26.7	30.7
95,000	747D953M016BL2A	2.000 x 3.625	4.4	2.5	28.0	31.6
110,000	747D114M016BC2A	2.000 x 4.125	4.0	2.3	31.1	34.9
130,000	747D134M016BD2A	2.000 x 4.625	3.7	2.2	34.0	37.9
150,000	747D154M016BE2A	2.000 x 5.125	3.4	2.1	36.8	40.7
160,000	747D164M016BF2A	2.000 x 5.625	3.2	2.0	39.3	43.3
25 VOLTS DC WORKING; 32 VOLTS DC SURGE						
7,700	747D772M025AN2A	1.375 x 1.625	21.8	9.0	7.4	9.3
10,000	747D103M025AY2A	1.375 x 1.875	16.6	7.0	8.9	11.2
12,000	747D123M025AA2A	1.375 x 2.125	13.6	5.9	10.3	12.9
18,000	747D183M025AM2A	1.375 x 2.625	10.1	4.4	13.0	16.0
23,000	747D233M025AB2A	1.375 x 3.125	8.2	3.8	15.5	18.8
28,000	747D283M025AL2A	1.375 x 3.625	7.0	3.3	17.8	21.5
29,000	747D293M025BA2A	2.000 x 2.125	7.6	3.8	17.6	20.9
33,000	747D333M025AC2A	1.375 x 4.125	6.2	3.0	20.0	23.9
35,000	747D353M025BM2A	2.000 x 2.625	6.6	3.4	20.3	24.0
38,000	747D383M025AD2A	1.375 x 4.625	5.6	2.8	22.1	26.3
44,000	747D443M025AE2A	1.375 x 5.125	5.1	2.6	24.1	28.5
46,000	747D463M025BB2A	2.000 x 3.125	5.3	2.8	24.1	28.0
49,000	747D493M025AF2A	1.375 x 5.625	4.8	2.4	26.1	30.6
58,000	747D583M025BL2A	2.000 x 3.625	4.6	2.5	27.4	31.6
70,000	747D703M025BC2A	2.000 x 4.125	4.1	2.3	30.5	34.8
82,000	747D823M025BD2A	2.000 x 4.625	3.8	2.2	33.4	37.8
93,000	747D933M025BE2A	2.000 x 5.125	3.5	2.1	36.1	40.6
100,000	747D104M025BF2A	2.000 x 5.625	3.3	2.0	38.7	43.2
35 VOLTS DC WORKING; 44 VOLTS DC SURGE						
4,800	747D482M035AN2A	1.375 x 1.625	26.6	9.0	6.7	9.3
6,500	747D652M035AY2A	1.375 x 1.875	20.2	7.0	8.11	11.1
8,100	747D812M035AA2A	1.375 x 2.125	16.4	5.9	9.4	12.8
11,000	747D113M035AM2A	1.375 x 2.625	12.1	4.5	11.9	15.9
14,000	747D143M035AB2A	1.375 x 2.125	9.8	3.8	14.2	18.7
17,000	747D173M035AL2A	1.375 x 3.625	8.3	3.3	16.4	21.4
18,000	747D183M035BA2A	2.000 x 2.125	8.8	3.8	16.3	20.8
21,000	747D213M035AC2A	1.375 x 4.125	7.3	3.9	18.5	23.8
22,000	747D223M035BM2A	2.000 x 2.625	7.6	3.4	18.9	23.9
24,000	747D243M035AD2A	1.375 x 4.625	6.5	2.8	20.5	26.2
27,000	747D273M035AE2A	1.375 x 5.125	6.0	2.6	22.4	28.4
29,000	747D293M035BB2A	2.000 x 3.125	6.1	2.9	22.5	27.9
30,000	747D303M035AF2A	1.375 x 5.625	5.5	2.4	24.3	30.5
36,000	747D363M035BL2A	2.000 x 3.625	5.2	2.5	25.8	31.5
44,000	747D443M035BC2A	2.000 x 4.125	4.6	2.3	28.8	34.7
51,000	747D513M035BD2A	2.000 x 4.625	4.2	2.2	31.6	37.7
58,000	747D583M035BE2A	2.000 x 5.125	3.9	2.1	34.3	40.5
66,000	747D663M035BF2A	2.000 x 5.625	3.7	2.0	36.9	43.2

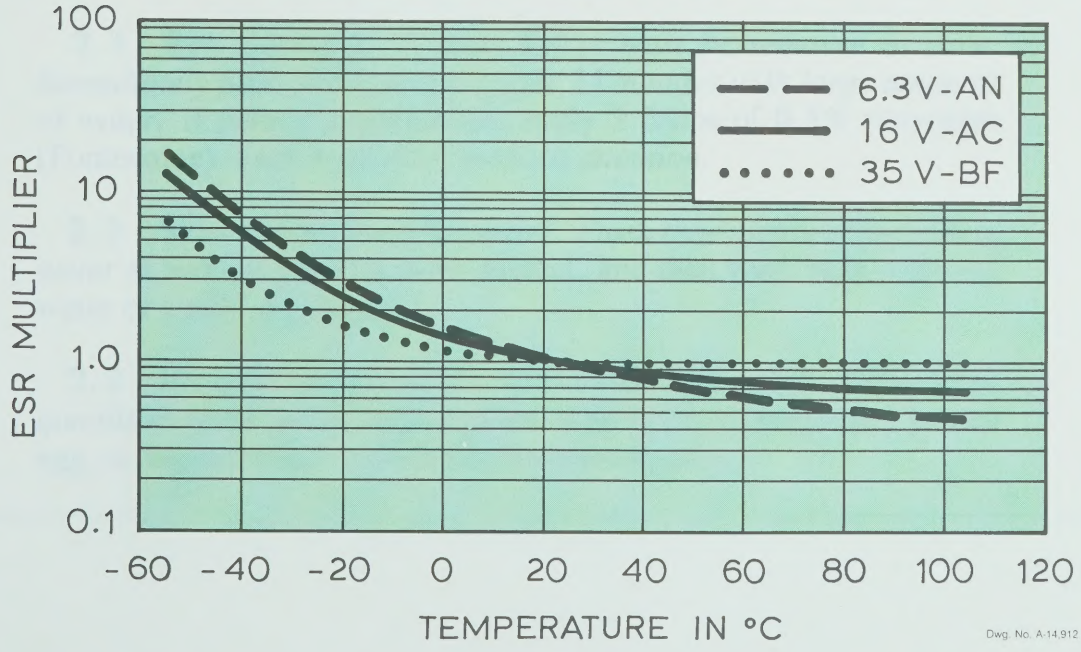
TYPICAL CURVES

TYPE 747D-TYPICAL CAPACITANCE MULTIPLIER
VS. TEMPERATURE @ 120 Hz



Dwg. No. A-14,911

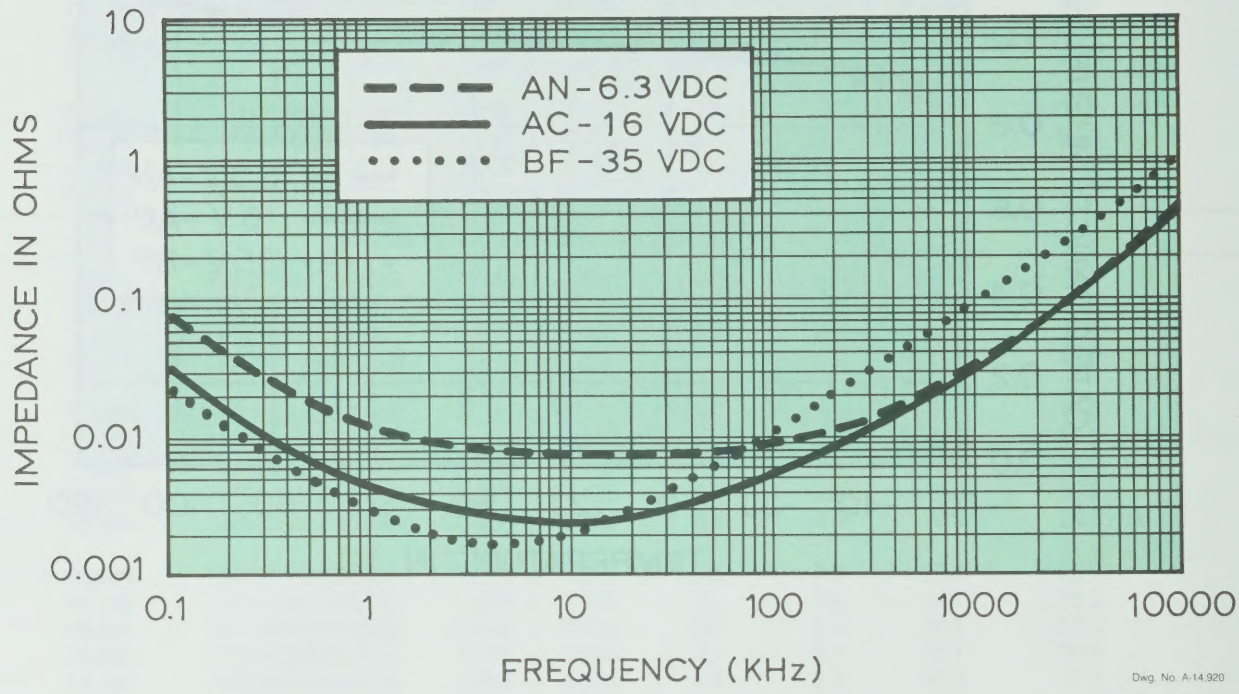
TYPE 747D - TYPICAL ESR MULTIPLIER
VS. TEMPERATURE @ 20kHz



Dwg. No. A-14,912

TYPICAL CURVES

747D — IMPEDANCE VS. FREQUENCY



Dwg. No. A-14,920

WARNING! DO NOT MISAPPLY ALUMINUM ELECTROLYTIC CAPACITORS

1. Caution Against Misapplication. Here are the most common forms of misapplication:

(a) Exposure to reverse voltage in excess of specified limits.

(b) Exposure to temperatures above specified limit.

(c) Application of voltage beyond specified surge voltage.

(d) Application of excessive ripple current or voltage. Do not exceed specification limits.

2. Personnel Safety. *Electrical misapplication* of aluminum electrolytic capacitors *may be hazardous.* Personal injury or property damage may result from explosion of a capacitor or from expulsion of electrolyte due to mechanical disruption of a capacitor.

Skin, eye or mouth exposure to electrolytes in aluminum electrolytic capacitors **MUST BE TREATED IMMEDIATELY!**

2.1 Eye Contact. *Contact lenses must be removed at once. Immediately flush the open eye(s) for 15 minutes with large amounts of water.* If pain is experienced, apply 2 drops of 0.5% tetracaine (Pontocaine). *Seek immediate medical attention.*

2.2 Skin or Clothing Contact. *Flush thoroughly with running water* as soon as possible after contact, and then wash with soap and water or a mild detergent.

2.3 Mouth Contact or Accidental Swallowing. *Drink large quantities of water or milk.* Follow with Milk of Magnesia, beaten egg, or vegetable oil. *Call physician immediately.*

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